

MILITARY REVIEW

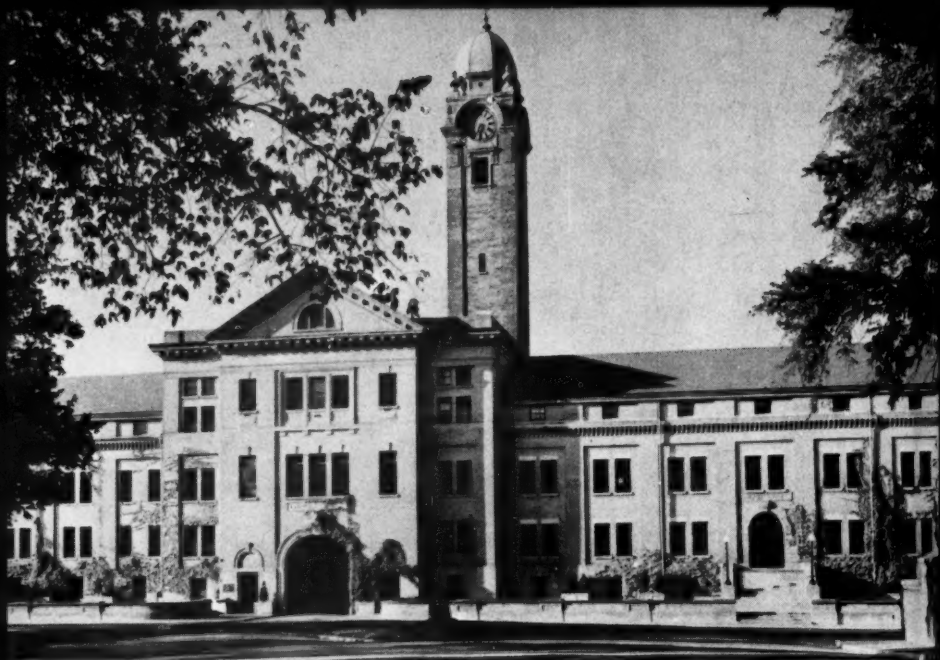


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TACTICAL AIR SUPPORT FOR ARMY FORCES

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The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

TACTICAL airpower is a most important facet of the military capability of any great nation in the world today. However, this type of airpower is much discussed, and, unfortunately, much misunderstood, and it is necessary to have a common understanding of the term "tactical air support" for the discussion to be meaningful. One of the purposes of this article will be to clarify the concept of what is meant by tactical air support of ground forces.

There appear to be three viewpoints on the subject of tactical airpower; the first as seen from the vantage point of the Air Force, the second as envisioned by the Navy-Marine combination, and last, but not the least important, the ground level view of the Army, which, after all, is the key to the problem as it is the major force being supported. The Army viewpoint has never really been set forth strongly and independently, and it is probably its own fault in this regard,

for vociferous and at times public demands cannot long be ignored. This paper will attempt to set forth the case from the viewpoint of the Army and focus attention on the needs of the Army for the airplane type of supporting weapon.

In order to appreciate fully the tasks facing the Army in the event of global war, or even a series of "police actions," the capabilities of the Soviet Army-Air Force combination will be touched upon. This potent military force is the one which must be defeated or neutralized in the event of open warfare, as it is the only major enemy military force opposing the United States today.

The Problem

From the aviation viewpoint there are two major types of air operations, strategic and tactical. While the subject of this article is tactical air, the concept of strategic air will be established for a better understanding of the deep interdiction problem which will be brought out later.

Strategic air operations are those air operations designed to effect—through the systemic application of force to a selected series of targets—the progressive destruction and disintegration of the

The Army should exert every effort to obtain satisfactory close air support from the Air Force for its ground units engaged in combat. Failing in this the Army must plan to provide its own close air support

enemy's warmaking capacity to a point where he no longer retains the ability, or the will, to wage war. Targets may include key manufacturing systems, sources of raw material, critical materials, stockpiles, power systems, transportation systems, communications facilities, concentrations of uncommitted elements of enemy armed forces, key agricultural areas, and other target systems.

Tactical Air Support

Tactical air operations are those air operations conducted against an enemy's military forces, his installations, and his routes of communication. A very important facet of this type of air operation is the understanding that the general mission of tactical airpower assigned to the support role in a battle area is the same as that assigned the supported forces—the defeat of the enemy military forces.

This understanding impinges upon one of the fundamentals of military operations—that of unity of command on the battlefield—and has been the source of wide disagreement among the forces involved. The resolution of this point is one of the keys to successful tactical air operations.

Under the broad principles of employment of airpower, it is generally agreed there are three tasks to be accomplished by tactical airpower:

1. That air superiority in the theater of operations must be gained and maintained.
2. That the selected battle area must

be interdicted to deny the movement of enemy troops, equipment, and supplies.

3. That close tactical air support must be provided to the surface forces in the battle area.

The first task mentioned above is exclusively the traditional role of the airplane in air-to-air combat, and includes in modern warfare the bombing of enemy airfields and other facilities which contribute to his airpower. As this task is expanded upon, it overlaps into the interdiction battle, and, finally, into the strategic role, as, for instance, the destruction of the enemy's petroleum sources and facilities. These tasks are of interest to the ground commander under the guise of general support, and, of course, they are of paramount interest to the theater commander. However, the task which is of prime concern to the ground commanders at all echelons is the close support role.

Close Support

In the accomplishment of his close support mission, the ground commander utilizes his infantry—either on foot or mechanized—as his chief means of gaining and holding ground wrested from the enemy. All other forces are in the nature of supporting means; however, this does not lessen their importance, and they must be integrated and co-ordinated with the operations of the infantry. Particularly is this true of the forces which contribute firepower to the destruction of the enemy, such as artillery, tanks, rockets, missiles, and mortars—and there is no reason to exempt airborne delivery of firepower.

It is for this reason that the ground commander is vitally interested in the third task of tactical air—that of close air support. More exactly, this term should be direct air support of ground troops, with close air support being a subtask. This article will adhere to the following definition of the terms:

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Direct air support.—Air operations which are directly related to the combat operations of ground troops.

Close air support.—A subtask of direct air support involving the attack by aircraft of hostile ground targets which are so close to friendly forces as to require detailed integration of each air mission with the fire and movement of those forces.

Close reconnaissance air support.—A subtask of direct air support whereby complementary information or intelligence is gained visually, electronically, and photographically by aerial means.

Scope

The subject of airpower is so vast that even a small segment of the topic can hardly be discussed adequately in a limited space.

While it is difficult to break the subject into segments, and to get any two authorities to agree on the composition of the segments, my purpose at this time will be to treat on the subject of direct air support as defined here. More specifically, it will confine the treatment to the two major subtasks of close air support and close reconnaissance air support, as defined. This is not to say that it is not recognized that there may be other segments to the problem of direct air support such as air transport by helicopter or fixed-wing aircraft, but for the purposes of this article the subject will be delimited as explained.

Close Air Support Analysis

During the growth phase of airpower, the Air Force expanded tremendously and during the process was able to write its own concepts, functions, and organization. This phase culminated in the establishment of a separate air force.

The Air Force concept of what constitutes its job continues on an almost unilateral basis.

The Air Force deems there are two ma-

ajor functions or categories of airpower in which it is interested, strategic and tactical, and both terms are used in their broadest military sense. Therefore, at present, the "tactical" aspect of airpower, as defined by the Air Force, is almost anything in the way of airpower that is not a part of the strategic air command. This means that in its broadest sense, airpower allotted to a theater of operations will be assigned to missions to further the objectives of that theater, and that any missions which are not strategic in nature are tactical.

The United States Air Force Air-Ground Operations School stresses this point in its instructions; the theater air commander integrates the airpower under his control with the Army operations. The air efforts are designed to further the military campaign by:

1. Neutralizing or otherwise preventing the enemy from using airpower against friendly surface forces.
2. Containing the enemy within a certain area by preventing a flow of supplies and reinforcements to his frontline units and thereby facilitate their destruction by friendly surface forces.
3. Attacking and destroying enemy positions, personnel, and equipment on the immediate front to facilitate the advance of friendly surface forces.

In order to accomplish the above missions, various types of wings such as fighter bomber, night intruder, reconnaissance, and a tactical air control group are assigned to a tactical air force; and they are employed in consonance with the principles of integration of effort, centralized control, flexibility, and mobility.

These are the classic principles of employment, but some senior Air Force officers have added a new one—that of equality of command between air and ground.

It must be remembered that these are strictly Air Force principles, but they have cut across other, and more funda-

mental, considerations. One of these time-tried considerations is *decentralization* of responsibility and authority, as opposed to the formal principle of *unity of command* on the field of battle. This conflict of considerations is one of the existing hard core problems which will be discussed in more detail later.

There is no disagreement on the necessity for air superiority, or air supremacy, if it can be attained, on a theater-wide basis—or at least on a local air superiority basis at times in order to win local battles. It has been stated by well-known contemporaries that if an enemy nation makes more than a token air effort against such a highly mechanized force as the United States Army, the Army can have no hope of achieving success unless it has adequate tactical air support.

The threat of a potential enemy to challenge this air superiority is one of the most pressing problems facing the Air Force.

It is indeed clear, that with the Soviet Union—the largest potential enemy of the United States and possessing one of the largest air forces—air superiority in the early phase of a war will be a vital requirement for the victor apparent. Students of this military situation, playing force against force, have concluded that during the early part of any such war, and possibly extending for a longer period of time, the scarce tactical air forces of the United States will be preoccupied with the Soviet tactical air force and its bases, rather than on the direct support of the ground battle.

Further, the strategic air forces will be occupied with their own missions, and it is highly unlikely that they will be diverted from their primary missions to render close ground support. Strategic type aircraft are not well suited to the close support role and are not instru-

mented or equipped therefor, nor are the aircrews trained to work with the ground forces on a tactical mission.

With the Air Force thus disposing its available aircraft to meet the requirements of tactical aviation—by its definition—it is apparent that the higher priority mission of air superiority will have first call upon the tactical air forces, and the ground commander must, perforce, wait for any direct air support.

How long must he wait? According to present plans, he must wait until the Air Force concludes that air superiority, even if in a local area, has been attained and that tactical aircraft can be released to make a direct contribution to the ground operation.

This is a grim thought from the viewpoint of the doughboy and the ground commander, for it means they must fight virtually without benefit of one of their most potent weapons.

Of course, it is pointed out by the Air Force that the theater commander assigns the priority of missions in his theater, and that if the ground support mission is assigned, they will execute it. However, every battalion commander in a frontline battalion cannot have access to the field marshal to ask for a close support strike, with priority.

However, what the battalion commanders and all other ground commanders must do is make their requirements for close air support known to all echelons of the services, and promulgate and defend them together with their doctrine of employment—the same as they do for artillery, guided missile, or mortar support. Otherwise, they will do little but continue in their present position and accept the Air Force concept of when and how much air support they will get in direct support of the ground battle.

No discussion of close air support would be complete without mention of actual operational experience. The air capability

had not yet developed during World War I to a point where any significant deductions can be made, but, World War II and the Korean "police action" do furnish valuable information on the subject. Even a little can be gleaned from the recent small war in Indochina.

The significance of the point noted earlier of distinguishing between the various Air Force missions may be further appreciated by a statement in a report summarizing tactical air operations in the European Theater during World War II which points out that it is indeed difficult to draw a fine line between strategical air operations and tactical air operations. This situation is even more true today as ranges and speeds of aircraft have increased over their predecessors.

No Joint Doctrine

It is not generally recognized that at the outset of World War II, even with the Air Corps being a part of the Army, there was no approved joint doctrine of employment and neither were there manuals nor training literature. The air and ground commanders were strictly on their own, and it was this condition which sowed the seeds which reaped the separate air force and left the Army without its direct tactical support. Historians repeatedly point out that throughout the war the air commander had to consider his own problems first, and such support as was given to the ground forces was a result of mutual co-operation between tactical air commands and the armies developed during operations. This is not to say that mutual co-operation is not good, for the record shows that some of the most remarkable achievements were those attained by day-to-day co-operation. These successes warrant a closer look to see if the problems of today may not be solved similarly.

During the St. Lô breakthrough, air firepower destroyed 2,000 vehicles, 80 artillery pieces, and 100 tanks in 1 week.

This caused Major General Hickey, who commanded an armored division in the operation, to exuberate, "The best tank destroyer we have is a P-47." The historians point to further co-operation whereby remarkable results were obtained by air-ground assault elements in rapid advances and critical attacks through the use of forward controllers. It is significant to note that during these operations the ground commanders were allowed to talk pilots down to the target—a practice which is presently not possible.

The preoccupation of the air commanders with their own air-to-air battle, and strategic and deep interdiction bombing, left extremely little close support for the ground commander. Of course, it is admitted that the close support air strike is probably one of the most difficult to accomplish successfully, day in and day out, but, in 1944, only about 8 percent of the Eighth Air Force in Europe was employed tactically. Even the tactical air command—whose primary mission was close co-operation with the ground army—dispatched only a little more than one-third of its available sorties for this primary function. It is difficult not to conclude that the ground forces did not have the type of ground support which they deserved or which had been planned for them.

The difficulty the ground commander had, during the crucial battles of 1944, of obtaining such close support may be imagined, when, in each case, it had to be decided by no one less than the Supreme Commander. It is understood that massing of bombers for carpet bombing in front of ground troops is extremely costly in terms of effort diverted from other targets, and that co-ordination of air and ground had to be accomplished. But why at such a high level? It placed the Supreme Commander in the position of having to decide on a basis of winning campaigns as opposed to battles.

Yet, it was such close support—when it was provided—that was so destructive of the enemy's forces. Captured German commanders stated that the heavy carpet bombing along the main line of resistance was the type of aerial firepower most detrimental to their ability to defend a position. Still other German commanders considered that the ground controlled frontline fighter-bomber type of air mission was most detrimental, especially to the morale of the defending troops and the destruction of forward supply dumps.

However successful was tactical air during the 1-week battle at St. Lô, in the mission of close support, this was one of the few such actions. Some divisions never received any close support at all, and others in varying degrees, depending upon "the mutual co-operation." A review of the over-all air effort indicates that a large part of the effort of the tactical air force was expended in the classic task of tactical air interdiction of the battlefield. About one-third of all the bombs dropped in the European Theater—roughly one-quarter of a million tons—were dropped in this effort against transportation targets. In the over-all, only an estimated 8 percent of German tank casualties was caused by tactical air strikes. This is quite a contrast to Korea, where, with no enemy air opposition, tactical air strikes caused about 40 percent casualties to enemy tanks.

Korean Conflict

The entire story of the Korean operation is an anomaly in itself, for while a review of the tactical air support given the ground forces reveals some interesting operations, conclusions drawn should be scrutinized with great care. The Supreme Commander himself cautions that the Korean conflict should not be the sole basis for changing any of the fundamental doctrines on the role of tactical air support. In fact—except in the early stages of the

combat—few ground commanders experienced the benefits of close air support under combat conditions which required all-out air support.

The Korean conflict may be represented by three oversimplified generalities: first, the United Nations forces had air superiority, which later became air supremacy; second, except for the first year's fighting which was mobile, the balance of the action was a war of entrenched position; and third, weak and confused political considerations hampered the military commanders in the field through delimiting the battle area, permitting the enemy to have a privileged sanctuary and year-long truce talks.

In retrospect, the first anomaly of the Korean conflict was that, in spite of clear-cut air superiority, all air support for the ground forces had to be co-ordinated and directed by the United Nations Commander in Tokyo. The ground commander in Korea had absolutely no command or operational control over air or naval craft in support of his operations. As a result, the enemy buildup continued almost unabated, although the interdiction and pseudostrategic air campaigns were pushed to the utmost. These so-called "strangle" operations against the enemy rail and highway traffic in daylight were not decisive in the over-all effects, but it did force the enemy to move at night, which he did with great effectiveness.

The second anomaly was that even with air supremacy, the air commanders chose to expend the major force of their capability on other than close air support missions. Only an average of a dozen or so flights were made daily in support of the ground divisions actively engaged against the enemy in 1952—although the supporting air forces had a far greater sortie-rate capability. Marine Corps aviation, when permitted to do so, generally provided about three times this amount of close air support in terms of planes,

bombs, rockets, and napalm, and were more efficient in their use—attacking more enemy troops and gun positions, and fewer huts and buildings—than the Air Force.

The political prohibition against using the strategic bombers in their normal role across the Yalu, produced another oddity of the Korean conflict by forcing the use of these big bombers, B-29s, for close support carpet bombing operations, if they were to be used at all. Some of these attacks were made by radar control at night and the exact results could not be measured quantitatively. Such attacks in daylight were exploited by immediate followup ground troops who reported the raids were stunningly effective. The tremendous effort and cost of using large bombers for close support may be imagined, even if it did slow down the enemy in his night attacks.

In the spring of 1953, the air and ground forces in Korea conducted a joint experiment to smooth out 13 problem areas existing under the present joint doctrine. This was in the nature of a controlled maneuver for training purposes, for there was no enemy air opposition and the ground forces were in a static position. As a result, the findings were not necessarily conclusive as there were few good targets and the ground forces could not exploit the attack after the air strikes. What the test did show was that even with good communications, and good co-ordination between the air, ground, and artillery, it still took almost an hour to bring air firepower onto targets by friendly planes on ground alert; it also indicated the need for a great deal more photographic and visual reconnaissance by both Air Force and Army aircraft.

One area of the world in which a hot war recently operated was in Indochina. This again was a war in which the friendly forces had air superiority, but the terrain and guerrilla type fighting forced a reassessment of the air capability. The

traditional position of the airman is expressed by the Air Officer Commanding, Far East, France, who states:

The air command cannot agree without protest to equipment as costly and scarce as the aircraft being used for missions (close support) which can be accomplished equally well as [by] less costly arms, such as the artillery.

He admits that a less costly means is vitally necessary to deliver firepower from the air, and he further deduces that the current system of calling up firepower to hit lucrative targets in the Indochinese type of warfare is something less than satisfactory. He goes on to say:

The small, slow observation aircraft, the 'midge,' has thus become the cornerstone of the war in Indochina, as in Korea, and as in Europe tomorrow. The 'midge' sees but does not itself attack, and can only call up the attackers. However quickly the latter may arrive, the advantage of surprise is frequently lost, and the Vietminhs have already decamped, whenever they can. We should, therefore, work on a light, tactical, 2-seater, with a maximum speed of not more than 240 miles an hour, and a minimum speed of about 50 miles an hour. Its weight—about a ton—would enable it to use any kind of airstrip of some 400 yards long. It should be armed with two machineguns, a few rockets, a very high frequency (radio) set, and be armored underneath.

The French are procuring an American-designed aircraft—the *Fletcher*—which is manufactured in Japan, for this purpose.

Summary

A summary of the lessons to be deduced from these examples of operational usage of close air support of ground forces seems to be that such a type of air support is extremely effective in supporting the ground battle. The complete integration

of all types of supporting fires is essential to the success of the ground battle; this includes conventional artillery, guided missiles and rockets, antiaircraft artillery, and the air bomber. Radar controlled bombardment aviation is distinctly effective, and interdiction and neutralization bombing of enemy concentrations accomplished during the hours of darkness will greatly aid in the defeat of the enemy. Artillery and air support must be *prompt and continuous* as long as enemy pressures endure. When the enemy breaks contact to retire, *only close air support can pursue rapidly enough to be effective.*

The relative paucity of close and continuous air support of all the combatant ground forces, actually engaged against the enemy in past hot wars, indicates a need for a fundamental and vital decision whether air support operations to gain and maintain air superiority should be planned sufficiently independently of interdiction and close support operations to permit a separate requirement for close support.

Current Doctrine

The Air Force concepts of air support were dealt with in some detail earlier. The current doctrine in use for joint training and operations largely reflects those Air Force concepts. The principle of unified command at theater level is accepted as the apex of the command pyramid. Under the theater commander there are two forces, the ground and the air, with coequality of command. Under the ground forces there is a vertical chain of command, and, similarly, under the air commander there is a vertical organization.

These two vertical forces come into parallel at the army group level with a coequal tactical air command, and the field army level with a tactical air force. Below this level there is not a comparable parallel organization. Co-operation at

all echelons is the key to the successful functioning under this doctrine of air-ground operations. Any use of air in the ground campaign is, perforce, a joint operation, and requires that all the planning and execution and close co-ordination peculiar to joint operations be achieved between army groups and tactical air commands and between field armies and tactical air forces.

It should be noted that joint planning is possible only at these two levels of command—except for theater level—but concurrent planning extends through all echelons of both forces. An important planning principle is that co-operative air-ground effort is integrated at that command level which produces the maximum continuing results from the available air and ground forces. To provide rapid communications, flexibility, and control, it is essential that these operations be conducted at the lowest possible echelon of command. Since the tactical air force is the lowest echelon of the air forces which plans and conducts independent operations, the field army and the tactical air force form the fundamental air-ground team.

Thus, instead of the supporting arms conforming to the level of command and organization of the ground forces being supported, the supported forces are compelled to complicate their structure to meet the form of the supporting unit. This is an untenable situation which has been criticized repeatedly. Since the basic tactical unit in the ground forces is the division, it would seem only logical to integrate aerial firepower at this level. This discrepancy in the logic of our administrative and command organization has been pointed out repeatedly by students of the situation. In fact, many military commanders feel that detailed planning for close air support operations should be carried on at army corps level or lower.

On the other hand, if the current doctrinal organization is sound, since the tank is a costly, mobile, and flexible weapon, it would be just as logical to plan, co-ordinate, and direct the firepower of tanks in the reconnaissance company of the division from a fire direction center at army headquarters.

The problem of coequality of command of a supporting force commander with the supported ground commander is one of the crucial problems which must be solved if effective close air support is to be obtained.

The Marine Corps has solved this problem by maintaining the basic principle which governs command relationships without regard to the particular type of weapon being used. Thus, while the Marines have separate aircraft wings and helicopter assault forces as a part of their aviation organization, they are placed under operational control of ground commanders as necessary. The tasks being performed will govern the assignment of operational control. The Army could well profit from this example.

Soviet Tactical Air

The Soviet Union is a great believer in tactical air support for her ground forces, and, since she is the only potential major military threat to the United States, it would be only prudent to take a look at military makeup and capability of these forces which could conceivably face our own on the field of battle.

Unfortunately, the Soviets guard their military secrets zealously, and we do not have too many details concerning their operations. However, what we do know, coupled with what we suspect, is enough to give pause to the military planners and tacticians.

The basic doctrine of the Soviet military, like most things Russian, is fundamentally realistic, and is probably well expressed by Volkov's statement:

The struggle for air superiority should be centered first of all around the ground effort. The reason for this is that only by means of ground action can the strategic aims of the war be attained. No independent air action can hope to achieve results of importance equal to those of air actions carried out in the interest of the success of the over-all ground effort.

Earlier, the noted Soviet airplane designer, Sergei Ilyushin, declared in a speech in 1942 that:

We have never accepted the doctrine of an independent air force winning a war by massive long-range bombardment. We have always thought that the main role in aviation was the support of ground forces.

This policy was definitely confirmed as official Soviet doctrine by Marshal Konstantin Vershinin, Chief of the Soviet Air Force, in his statement that the primary mission of the Soviet Air Force is to assist the Army. Nearly everyone is working hard to develop the ability to strike the enemy forces on the ground and to protect the Army's ground operations.

The Soviets have implemented their doctrine in full measure, for over half of all Soviet airpower is designed primarily for direct support of ground forces. These Soviet ground forces are heavily and directly supported by tactical aviation as an essential combat arm performing some roles normally reserved for armor and artillery. In fact, the co-ordination between the air force and the artillery was excellent in the battles by the Soviet Union against Germany.

The Soviets have organized their air arm in a manner which makes it possible to serve with, and in, the ground organization as an integrated team. The organizational nomenclature of the air units corresponds to that used for ground units, and in supporting ground actions, air

units are used as members of the infantry, armor, artillery team, and use the same radio frequencies as the units they are supporting.

Thus, the basic tactical air unit is the air regiment with a fixed table of organization and equipment containing from 30 to 50 planes—depending upon type—and is assigned usually on a basis of one per assault ground division.

This type organization is built up vertically—much the same as a United States Army—to the point where the air regiments have grown into air armies and assigned normally one for each ground army group and tactically subordinate to the ground commander.

The tactical employment of the air army assigned to the army group is in consonance with the Soviet tactical doctrine that support of the ground troops is the main task of the air force. For the preparation and breakthrough phase the air units act in support of ground units; but, under the fluid conditions of the exploitation and pursuit phase, air units are attached directly to mobile ground units on the basis of one air regiment per ground division. Ground attack air units are frequently placed in support of a rifle unit operating a distance away from the army group or, perhaps, to an armored unit operating behind the enemy lines. The army commander then does not have to appeal to any group to require quick action from the Soviet Air Force units. By subordinating the air supporting unit to the ground supported unit, the Soviets achieve the unity of command so vital on the battlefield.

The Army's Position

It has been stated recently by John W. R. Taylor in *The Royal Air Force Quarterly* that:

Close air support is one of the finest weapons any modern army can possess, and it is certain that ground forces will

demand more and more air cover in the future.

Students of military science and tactics, and military commanders themselves, are coming into agreement with the concepts of this statement, but the details of how much, when, by whom, and similar considerations have yet to be resolved in the United States Army.

The Army takes the position that there is an indispensable requirement for adequate, effective air support for ground operations at all times, and that this requirement should be met at the earliest possible date.

Senior army commanders have taken a firm stand of the indispensability of the Army's requirement, and have further stated the need for operational control of the air support by the ground commander. They admit—to counter the Air Force argument—that the present-day fighter-bomber aircraft at times may be used to assist in the air battle in the gaining of air superiority, and that it should be used in this role—but only at such times as there is not an overriding requirement for close support.

There may be situations where the military forces are engaged against an enemy having a great superiority of airpower when centralized control of tactical air units under a senior air force commander may be necessary. If this should occur, however, this commander must have the authority to allocate such air wings as are necessary to support the field armies, depending on the over-all air situation and relative needs of the various armies for close air support. However, when once allocated to the support of an army, or independent corps, the army or corps commander should have operational control of such wings, and he should expect to continue to have such support and control until the completion of his mission.

The parallel between this Army concept

and the Soviet system, which was explained, is at once apparent. The Army concept, however, is not accepted by the Air Force and it is along this line of cleavage that the present air support doctrine is split. The Air Force insists on controlling its own units on a coequal basis with the ground commander and providing air support in co-operation with him. The Army must stick to its guns, for it has an abundance of support for its position.

Experiences in Korea indicated that the Army should have the capability of applying close air support on targets near front-line positions within 5 to 10 minutes of detecting the target. However, even under the most favorable conditions, it takes about 1 hour to bring such targets under air attack under the present system. Sometimes the targets do not wait that long.

It is such experiences in combat that show that it is almost inevitable that considerable time must elapse before request by one service for support from another service can be complied with. There have been repeated instances of delay by the Air Force in the furnishing of badly needed air reconnaissance and tactical air support to army units in critical areas. Of course, this is not by design or plan, but the complicated joint mechanics of communications and command channels consume time, and the air force commander must necessarily consider the competing demands of other air force missions on his available resources. The observation that optimum efficiency of tactical air support can never be achieved under the present doctrine is attributed to a former Chief of Army Field Forces.

Other senior Army commanders have stressed that nothing less than operational control—over both tactical offensive and tactical reconnaissance air elements—will be required in any future war against a major power in order to assure that there will be unity of command on the field of battle; that Army commanders will

receive appropriate consideration of their requirements in the application of available air support; that ground commanders will be able to depend on the use of a definite amount of tactical air support while it has been allocated for close support and integrate its use in his plan of battle; and that the power of decision on targets to be attacked in the execution of the ground campaign will be vested in the responsible ground commander.

Although the first of these requisites—unity of command—is a time-tried and fundamental principle of war, the Air Forces have resisted—and probably will continue to resist—vigorously, any action which might tend to allow the dispersal of Air Force elements to ground force commanders. That this principle is really basic and even applies to the field of logistics was pointed out by General Brehorn Somervell soon after the close of the war in his statement: "If there is one thing in the world that this war taught, as far as I am concerned, it is the question of unity of command."

For its part, the Air Force has introduced a new and untried—and therefore dubious—principle of complementary command which requires some type of mutual co-operation for any success it might induce. The ground force commander has thus been forced to adopt the Air Force doctrine in its entirety together with all the electronics and communications necessary for effective use of air support. Under this doctrine, control of the aircraft remains with the Air Force through the forward air controller. These controllers are pilots from the tactical air force assigned for ground duty with a division on a basis of one per battalion, or nine per division. This seems a waste of highly trained fliers, and it is probable that there never will be enough to man the ground billets—and fly too.

Under the present doctrines, against an enemy with strong airpower, as brought

out earlier, the Air Force will undoubtedly use the tactical air force primarily for tactical counterair operations and tactical air defense, while the Army's requirement for close air support will be relegated to third priority. If "air superiority" is never quite realized against such an enemy, the Army probably never will get any close support, or at least only in the degree that air superiority is attained.

A Solution

Faced with this grim possibility, some Army commanders have considered the practicability of the Army providing its own close support with airplanes especially designed for the job. There is much to be said for this concept as it can be shown that the job can be done at much less cost in terms of aircraft, aircrews, and logistical support. In other words, targets which the Air Force says it is unprofitable for it to attack because of the risk or diversion of a costly, high-performance aircraft from the mission for which the plane was designed—and it is hard to take issue with the argument on either a basis of cost or logic—could be attacked by less costly, but especially designed, aircraft under control of the Army.

As was previously mentioned, the French came around to this point of view in the war in Indochina. Further, they have been spending much effort in developing a plane especially designed for close support, which has high performance, and which does not require prepared airfields. Their *Baroudeur* is a 600-mile-an-hour jet plane which takes off from a dolly over unprepared strips, leaves the dolly behind, and lands on skids.

The United States Navy has developed a jet, the *Sea Dart*, which operates from water using a hydrofoil which streamlines into the fuselage. This high-performance plane would be ideal for close support as it could use any river, canal, or other body of water for its base. This plane

would be excellent for operations from snow, mud, or swamps. The Navy also has two experimental vertical takeoff fighter types which are expected to have exceptional performance. They are especially adapted to the close support role as they could land well up in the forward area, could be well dispersed on the ground, and be instantly available to the ground troops.

The United States Army has its requirement for close support *regardless* of the other missions of the tactical air force, and it must be in position to have such air support available and control it at all times. As has been mentioned, under the present concept and doctrine it can do neither. Such aircraft should be available under division control to perform in the antitank and antipersonnel role at all times. Speed of execution, certainty of availability, and completeness of control with a relatively cheap weapon should be its outstanding features. A group of from 50 to 75 such planes should be assigned to each division engaged in combat operations. By being satellited on the division, the need for the large overhead of the present wing organization would be eliminated, but additional communications and maintenance support would have to be provided by the division to support the combat group. As an average, about three combat air support groups should be assigned for each four divisions in a theater of operations.

Some thought has been given to using light, or liaison type, aircraft armed with rockets and napalm in the close support role. In fact, this proposal has sufficient merit to warrant testing without further delay. Several years ago, during the war, General Stilwell personally brought to the attention of General George Marshall that the *L-5* liaison aircraft could bomb effectively with a load of 500 pounds or more, and should be pushed energetically as a material contribution to shortening

the war. By June 1945, both the Navy and the Army at Fort Sill, proved that light airplanes firing rockets were successful as close support aviation, but nothing further has been done about it.

Aircraft designers and manufacturers outside the armed services have concerned themselves with this very problem and have set forth the following succinct line of logic:

If the aircraft used to gain air superiority and perform missions of interdiction are to be of the highest performance possible, their design and functions should not be compromised by the conflicting requirements for close support of ground operations. This line of reasoning, therefore, clearly defined a need for a specialized close support weapon to augment the existing tactical air force.

A plane of this type has already been designed and flown and could be produced at a cost of about \$25,000. When it is realized that the cost of today's high-performance jet fighters varies from \$250,000 to \$500,000 each, sober thought must be given to the proposition that 10 times the number of airplanes which could deliver 5 times the amount of close support firepower could be purchased for the same amount of money or less.

Further, this type aircraft requires much less logistical support and ground crew support, is easier to learn to fly, and will, therefore, require less pilot training time. More important, however, this type aircraft does not require million-dollar-a-mile paved runways 7,000 feet long, but can operate off shorter, relatively unimproved fields or strips in the forward areas—much closer to their targets and the troops they are supporting. They would also be well dispersed around such unprepared fields and camouflaged for their own protection.

The traditional Air Force argument—it should be noted that neither the Navy

nor Marines argue against it—is that such type of aircraft could not live in the battle area. This same, tired argument was raised when the Army adopted small, unarmed liaison planes for artillery spotting and courier service early in World War II, but the record of these planes during that war, and in Korea, is sufficient proof to dispel the argument. Critical thought and immediate attention should be given to this matter by the Army planners and tacticians.

The luxury of mediocre intelligence can no longer be tolerated in our Army. While, in the above discussion on close air support, attention was given primarily to firepower support, it is also necessary that adequate visual, photographic, and electronic reconnaissance capability be included as a basic requirement in order to ensure adequate planning of the battle and effective placement and integration of all available firepower. However, the exploring of all the ramifications of such reconnaissance is a matter for a separate study and is only mentioned here in recognition of the problem. Tactical air reconnaissance should be included as a stated mission of close air support rather than as an implied function.

Conclusions

Close air support of ground forces with complete integration of effort is a *must* for the United States Army.

The Army has officially made known its quantitative requirements for close air support to the Air Force, but the Air Force has not met the request.

The Army, in consonance with a fundamental principle of war, "unity of command on the battlefield," has asked for operational or mission control of any aircraft allocated for the close support of ground units, but this has not been acceded to by the Air Force.

The Air Force has instituted new principles of "flexibility, centralized control,

and complementary or coequal command" in the command relationships between the commander giving support and the commander receiving support.

Present doctrine has not provided ground forces engaged in combat with adequate close air support—including both fire-power and reconnaissance—and is unsatisfactory in the following respects:

1. The necessity for a joint operations center at field army level, when the relatively simple function of bringing fire upon a target could be performed by existing fire support co-ordinating centers at division and corps level.

2. The necessity for a plethora of ground communications and radar and for duplicate communications either on the ground or in the aircraft to effect air-ground communications.

3. The use of high-cost, high-performance, or strategic type aircraft to perform a ground support function which could be performed by less costly and more specialized aircraft.

4. The requirement for highly trained pilots to perform frontline ground controller functions, and the necessity of double training the pilot as a parachutist—if

he performs with an airborne type unit.

The Army is capable of developing its own close air support means at less cost than would be provided by the Air Force. This would have the greater advantage of having the planes where needed when the need arose, and having them flown by pilots who understood the needs of the ground units with which they worked and of which they are a part.

The Soviet Union, our strongest potential enemy, has a large ground force well supported by tactical air forces under control of the ground commander.

Recommendations

1. The Army should exert, vigorously, every effort at high level to obtain, from the Air Force, satisfaction of the request for the quantities and control of close air support required to support ground units engaged in combat, and should amend the doctrine accordingly.

2. Failing in this, the Army should take the necessary steps to amend agreements and memoranda of understanding and proceed with plans to provide its own organic close air support with aircraft, organizations, and other means especially designed for the purpose.

Air-ground co-ordination, always of crucial importance, will be more important than ever before. The increased mobility of ground forces and the enormously increased potential for destruction afforded by modern weapons means that ground warfare will be more fluid. The so-called front may become indiscernible on the map and on the ground, with opposing forces intermixed in a swirl of individual battles. In such a situation, identification of friendly ground units from the air will be correspondingly more difficult although, at the same time, the need for swift and accurate air strikes will be more pressing.

General Charles L. Bolte, Retired

NEEDED

AMERICAN "GUARDS" OUTFITS

Major Mark M. Boatner, III, *Infantry*
Student, Command and General Staff College

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

THERE is an old saying that if you want a rabbit stew you must first catch a rabbit. Similarly, if you want unit pride—*esprit de corps*—you must first have a unit of which to be proud.

I wonder whether we have not tended to overlook this rather basic fact of military life in our present concern over "increasing service attractiveness."

Two developments in recent months have served to encourage the dedicated career soldier to hope that our Army still may attain the higher professional standards of which it is capable. The first is the Womble Report.* Let me quote just a few lines:

Esprit has been inhibited to the detriment of effective leadership. The continuous influx and egress of personnel in the Armed

* The report of the "Ad Hoc Committee on the Future of Military Service as a Career that will Attract and Retain Capable Career Personnel." Chairman was Rear Admiral J. P. Womble, Jr.

Forces is conducive to adoption of personnel policies which deal with individuals on a mass-production basis. Such procedures may produce dollar economy, but assuredly destroy unit and individual identity and, with it, esprit.

The report also points out that:

A further lowering of professional standards will not serve to lend attractiveness to a military career. On the contrary, resultant mediocrity will engender further dissatisfaction thus encouraging others to leave the service. Inadequate national preparedness will assuredly result.

The second heartening development announced in recent months is the Army's decision to adopt the unit rotation system. Senior officers have expressed a firm determination to make the system work.

One Elite Unit

Maybe we are finally ready to recognize the need for developing a few units of outstanding quality in our Army. I am talking about what other armies call "Guards" or elite units.

Our prejudice against quality outfits is deeply rooted. The fact that they exist

Perhaps now we are ready to recognize the need for developing a few regiments of outstanding quality within our Army—units which other armies have had for centuries and which they refer to as Guards units

in foreign armies is taken as evidence that the concept is vaguely "un-American." Furthermore, we have had a disenchanting experience with Ranger outfits both in Italy and Korea.

There are many people in our Army who do not have to be sold on the idea that elite units would pay off for us both in peacetime and in war. I am not so naive as to hope in the next few paragraphs to convert those who are skeptical or downright hostile. What I *am* naive enough to hope for, however, is that some day we will set up an elite unit as an experiment and give it a fair trial.

The easiest way to build up an elite United States regiment would be to choose a unit now in existence and shelter it for a while from constant personnel changes. The 3d Infantry—the Army's oldest—would be a logical choice, but it would have to be diligently "protected." The battle streamers on the colors of the "Old Guard" read like an outline of American military history through the Civil War. After World War II, the regiment was actually deactivated. The sad fate of the "Old Guard" has been so frequently cited in the last few years as an example of the American disregard for military tradition that I will not dwell further on the crime. I mention the subject here at this time only to emphasize what I mean when I say our elite units must be "protected."

Major Mark M. Boatner, III, has served with troops at the platoon, company, battalion, and regimental level during most of his career since graduating from the United States Military Academy in 1943. In Italy, after World War II, he organized and commanded the Lidò Training Center which trained noncommissioned officers for the initial TRUST Garrison. He was S3 of the 23d Infantry Regiment, 2d Infantry Division, in Korea, and returned from the Far East to attend the 1954-55 Regular Course of the Command and General Staff College. He is the author of several military books, the latest of which is Army Lore. His next assignment will be at the United States Military Academy.

Personnel

To command our model regiment we must pick a colonel who has already proved his ability to handle a regiment. (What a radical thought.) This is no job for a "directed military occupational specialty (MOS)" colonel—there is an entire regiment to be built up and the top man must know what he is doing. Avoid picking a "Boy Wonder" who will be more concerned with promoting his personal stock than in developing a solid unit—we want sterling qualities in our regiment instead of chrome plate.

Other regimental officers and noncommissioned officers, similarly, must be experienced leaders who have already demonstrated their ability to handle the jobs they will perform in the regiment. Before the conventional "personal administration" people accuse me of insanity for this last proposal, let me remind them that our mission is to make an elite *unit*. Fill the regiment with officers and men who are fumbling around to learn their own jobs out of the field manuals and the idea starts with two strikes against it—and a cracked bat.

Tours in the regiment would be stabilized at 3 years for officers and senior noncommissioned officers. The majority of enlisted men would be volunteers, and would serve a full hitch in the regiment. Approximately 30 percent of the men below the grade of sergeant could join the unit after they had received basic training—the regiment should be able to assimilate this number without a reduction of standards. Substandard individuals, however, would be eliminated and good men would be given an opportunity to transfer in.

After the regiment had taken about 3 years to shape up, it could start sending out cadres. Officers and men who had served a full 3 years in the parent regiment would be qualified to serve one grade higher in the new unit. Noncommissioned officer vacancies in the parent regiment

would be filled by promotion within the unit. Insofar as permitted by Army-wide personnel policies, officer vacancies within the regiment would be filled by moving regimental officers up one notch.

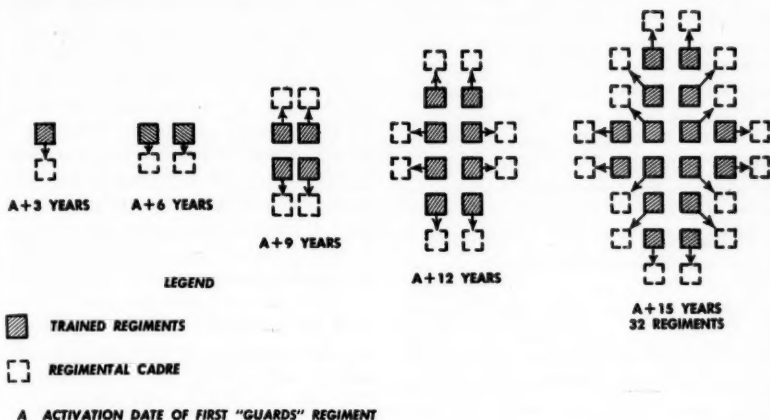
Those who subscribe to the theory that no capable leader should serve in the same position for more than a few months are now reaching for their pens (or secretaries, according to the echelon). The ugly

good "professional privates" to teach our recruits how to be good privates.

It is time we started thinking of the United States Army as a permanent institution. It must have a "hard core" of permanent *units*—not just a pool of trained *individuals*. These permanent units are going to need a few permanent sergeants and privates.

People who are hostile to any idea of

DIAGRAM SHOWING HOW ONE PROPERLY ORGANIZED "GUARDS" REGIMENT COULD PROVIDE HIGH QUALITY CADRES FOR THE ESTABLISHMENT OF OTHER ELITE UNITS. ORIGINAL REGIMENT, THREE YEARS AFTER BEING PROPERLY ESTABLISHED, WOULD CADRE A SECOND ELITE REGIMENT. THIS SECOND REGIMENT WOULD, IN TURN, START FURNISHING CADRES AT THE END OF THREE YEARS.



cry of "homesteaders" is raised. I maintain that we need a few more "homesteaders," if that is what you want to call a man who stays in the same job even after he becomes an expert in it. I would like to see a squad that is commanded by a sergeant who had held the assignment long enough to learn his job and to *sustain* a high standard of performance in it. I think there is a place in our Army for the man who is a magnificent sergeant and who has neither the capacity nor the desire for anything more ambitious. I think we have room in our Army for some

elite American units will advance the stock objection that an elite unit robs the rest of the Army of its share of good men. Initially, our elite regiment will "rob" the rest of the service of enough good men to form the cadre. Once established, the first elite regiment would repay the loan with compound interest. An elite unit would generate a high type of officer and enlisted leader who would go forth to spread higher professional standards throughout the Army. Also, an elite unit will make good soldiers out of many officers and men who would have

turned out to be mediocre if they had been trained in run-of-the-mill outfits. Get enough elite units in the Army, and we will attract a higher type of man into the service.

Quality or Mediocrity?

"An elite unit puts your best eggs in one basket," continue the Doubting Thomases. "All units must be of uniform quality." In rebuttal, I would like to point out that complete uniformity in something as large as the American Army can only mean reduction to the least common denominator of unit efficiency—in other words, uniform mediocrity. Most military missions can be accomplished—with high losses—by units of mediocre caliber. History shows many examples of tasks accomplished by a small number of elite units—with small casualties—when mediocre units had tried and failed. It is often sound military tactics to "put all your eggs in one basket" rather than to piecemeal them out.

Commanders have a tendency to work outstanding combat outfits to death. Our elite units must be saved in combat for the Sunday Punch and our commanders must learn how to use them. "Ah," say the doubters, "So your elite units are going to be so valuable you will not want to get them shot up." Certainly they will get in and slug it out in the mud when the time comes, like elite units before and since Napoleon's Imperial Guard. However, they will not be used to make the main effort day after day while other units are permitted to loaf.

Living Proof

This is not the place for complete administrative detail as to how the first elite regiment would be constituted. The fundamental points have been mentioned: put a competent colonel in command and leave him and his people alone long enough to develop a team; preserve unit integrity by protecting the regiment from excessive cadreing.

What would we be able to "prove" by such an "experiment"? Initially, we would have at least one fully mature, professional regiment in the American Army. We would get a chance to see esprit de corps, American style. We would have one regiment in which the officers and noncommissioned officers were fully qualified and whose men looked, thought, and acted like real soldiers.

The numerous officers and men of our Army who have never been treated to the spectacle could see the difference between a real military unit and a mere collection of men in uniform carrying the proper MOS.

This Guards regiment would establish the *practical ideal* for all others. Assign it any normal mission—garrison, combat, or occupation—and know that its performance would be the best any unit produced by the American military system is capable of giving. We could test our military system under practical conditions. For example, how would this unit show up in such things as absent without leave, venereal disease, courts-martial, company punishments and soldiers' deposits? How would it do on inspector general inspections? What would the re-enlistment rate be? How would troop information and education work? What type of schools could you run for officers and sergeants? Are the standards of the Expert Infantryman's Badge really too high? The questions are countless.

The regiment would be most valuable as a training ground for the officers and men who served in it. They would, first, see the standards which the American soldier is capable of attaining if properly trained and led. It would serve as a source of highly trained leaders for other units.

Once the regiment were well established, it could furnish a cadre for another first-rate regiment about every 3 years without destroying itself. Providing cadres from a unit over a long period of time is like giving blood. Of the 10 to 13 pints of

blood in a man's system he can give only one at a time without jeopardizing his own health. He must give his system time to rebuild the lost blood before he gives any more. Note also that if 10 patients need blood and only one donor is available, you do not decide "this is an emergency" and bleed the one donor dry. So with our elite units, we will have to fight off those who will be determined to bleed them white, particularly during "emergencies."

Patience in the matter of providing cadres will pay off in the end. In a few years, this one "mother regiment" would actually provide cadres for more elite regiments than we could support. It would work like this. Three years after activation, the first regiment would cadre a second one. In another 3 years, the first

regiment would produce its second cadre and the second regiment—now 3 years old—would produce its first cadre. At the end of another 3 years, you would have four elite regiments, each of which was ready to cadre another regiment. This puts a geometric progression to work for us, doubling the number of elite regiments every 3 years. At the end of the first 18 years we would have 32 elite regiments ranging in age from 3 to 18 years, and each prepared to cadre another regiment. (See diagram on page 19.)

Since World War II, we have tried many "new" ways of making soldiers. The results have been somewhat short of sensational. Let us return to a method that worked well before Alexander the Great. Good soldiers are made only in good outfits.

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ATOMIC DEFENSE

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This article is based on some ideas appearing in the author's book, ATOMIC WEAPONS AND ARMIES, published recently by Frederick A. Praeger, New York.

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

WHAT shape will the battles of tomorrow assume? Does trench warfare—with its deep shelters—provide us with the correct picture or does the blitzkrieg—with its rapid and profound penetrations by armored armies—give us a true picture? These are questions which are difficult to answer. Tactics are essentially a combination of fire and movement. New weapons produce new forms of fighting—new forms of attack and defense. The growth of firepower tends to increase the strength of the latter. As a result of the invention of atomic weapons, firepower increased a thousandfold. At the same time, the means of movement on the ground remain unchanged. Trucks and tanks are used as they were in the last war. It is easy to say that future tactics will require more speed, more briskness, and more flexibility in movement. However, all these notions have their invincible limits. It is difficult to see how ground maneuver can ever compete against tactical atomic weapons carried by 600-mile-an-hour jet aircraft, while guided missiles or atomic shells cannot be intercepted in flight. This fact has its unavoidable consequences, which

cannot be canceled out by tactical or technical countermeasures, except by the inventions of means of movement as revolutionary as the nuclear arms themselves—means which are still very far from being in sight.

In warfare, everything assumes a different aspect when both sides are basing their tactics upon the use of the same weapons. Clausewitz' old saying, "Defense is the stronger form of war," still remains valid. There are many factors which tend to favor defense. The attacker is compelled to operate in the open, whereas field fortifications offer, to a certain degree, shelter against atomic weapons. The defender can also protect himself more easily by camouflage. His strength is based mainly upon concentric fire, whereas success in attack depends largely upon physical concentration of forces, supported by fire. In atomic warfare, it will also be much easier for the defense to co-ordinate firepower from several separated positions, whereas for the attacker, it is incomparably more difficult—if not entirely impossible—to force a decision with his necessarily dispersed forces while every concentration inevitably becomes a highly vulnerable target for atomic weapons. Furthermore, an offensive can only be deployed from depth, and it is precisely there that atomic weapons exert maximum effect.

Without concentration in attack there can be no piercing power. Fire alone can hardly decide the issue, while without movement there can be no maneuver—consequently, no decision. Could not all this again lead to a bogging down of the fighting? In such circumstances it is very likely

that mechanized forces would lose their former importance; perhaps, less because of the numerous antidotes which they encounter on the battlefield than because of the high vulnerability of the cumbersome auxiliary services on which their success depends. It would be no great problem, in atomic warfare, to cut off almost hermetically the few supply channels in a 30- to 40-mile sector of an offensive. Whether paratroops would be of much avail also remains a matter of doubt. Large-scale landings can scarcely succeed in face of an enemy who has a powerful air force at his disposal. That, however, is another story.

In World War I, the battlefronts bogged down against the will of both sides. In a third war, in order to avoid a hostile invasion and win time for mobilization, it might be of interest to organize a type of atomic trench warfare, a possibility which is probably realizable with present-day tactical atomic weapons. Such disposition would be based on the combination of atomic artillery, tactical air forces and guided missile battalions, and conventional ground forces.

Atomic Artillery

Try to imagine a front 400 miles long, behind which atomic artillery is moved into line. Because of our own troops' safety, it cannot deal with targets in the forward area; therefore, its zone of action is con-

of about 6 to 8 miles in rear of the front-line. With a range of 25 miles, it will always be possible to co-ordinate the fire of four or six such guns on threatened sectors of approximately 20 miles width. The probability is small that the attacker might succeed in destroying all these weapons by air bombardments or other means, and the dispersion described above is designed to diminish any such eventuality. The security of these positions can further be enhanced by frequent changes. The use of dummy atomic guns would be another method of dispersing the enemy's attention in time and space.

Communication ensures co-operation between the individual atomic guns which, in the same way as normal artillery, are organized in troops of 4 and batteries of 12. Of course, on our imaginary front, the distribution of this special artillery is not uniform but is adapted to the characteristics of the theater of war—denser where the probability of attacks is greater, and less so behind natural obstacles such as rivers, or in mountainous areas. In its essentials, this system presents the same features as does that of conventional artillery. It is, however, carried out on a greatly magnified scale, where the guns are not 30 yards from each other, but spread over 4 to 6 miles, and where the batteries do not cover a frontage of 1,000 yards but some 40 to 50 miles. The present state of technique makes the co-ordi-

In warfare all things assume a different aspect when both combatants are basing their tactics upon the same weapons. Clausewitz' statement that "Defense is the stronger form of war" still remains valid

finied between 3 and 20 miles behind the enemy's line. In order to achieve adequate effect along the entire front and to cover all possible sectors against attack, it suffices if individual guns are put into position separately at intervals of 4 to 6 miles from each other and at a distance

nated functioning of such a system easily realizable. A battery of 12 guns could cover a frontage of about 50 miles, which on an average corresponds to a sector held by an army of 6 to 10 divisions. The defense of a front 400 miles long would necessitate about 80 guns.

Ammunition Supply

What would appear more difficult is the question of how to supply the positions with ammunitions. Atomic shells are costly and the quantity available is much more limited than ammunition for conventional guns. Both for material reasons and on grounds of security it is difficult for atomic artillery to be supplied with shells in the normal way. On the other hand, would an opponent be able to attack simultaneously on the entire length of a 400-mile front? Furthermore, he would take every precaution against divulging his intentions prematurely. Therefore, piling up of shells at each gun would merely be a dispersion of valuable energy.

However, here modern technique can help. Perhaps, it would be sufficient to keep, in each position, one atomic shell for each gun or, in more exposed sectors, two or three. If 80 atomic guns protect our front of 400 miles, then 100 to 120 atomic shells would do as a first ammunition scale, enabling the frontline to withstand the first shock of an unexpected attack. As we have said, our disposition, in spite of its dispersion, is articulated in such a way that several guns can cover each sector. How should the further supply of ammunition be organized? Scattered at a distance of 80 or more miles behind the front, and in small, carefully concealed dumps, supplies of atomic shells would be kept in readiness. Helicopters would assure

quick delivery according to the requirements on the battlefield.

It is difficult to gauge, in comparison with normal artillery, the firepower of 80 atomic guns, spread over a frontage of 400 miles. Allowing 5,000 conventional guns for one atomic gun, our line would be defended by a zone of fire corresponding to the enormous number of approximately 400,000 field guns of medium caliber.

Guided Missile Battalions

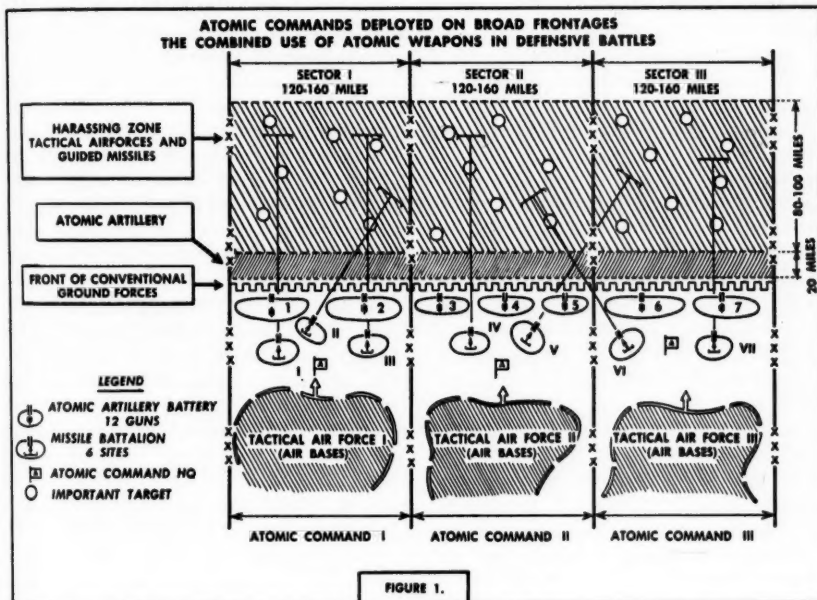
While the atomic artillery covers the immediate rear of the enemy's forward zone, the tactical air forces in conjunction with missile battalions will have the task of extending this effect in depth. Good results can only be expected if air reconnaissance, radar locating, missile launching units, atom bomb-carrying aircraft, and conventional fighter bombers work in conjunction. The main task of the tactical air forces and missile battalions is to prevent enemy concentrations on the front, thus making the launching of an offensive difficult. (See Figure 1.) During the battle, continuous air activity should isolate the attacking forces from their supplies and reinforcements. Both these tasks should be carried out with atomic projectiles as well as ordinary ones—generally in combination, to a depth of 100 miles.

The further the air forces and guided missile battalions act in hostile territory, the more indirect becomes the support which they can bring to their own ground forces. A penetration of about 100 miles would appear to be ample in order to impede efficiently large concentrations within this limit. A further extension of this "harassing zone" into the enemy's rear could easily provoke a dispersion of effort. The more the activity of the tactical air forces and the missile battalions is carried into depth, the greater becomes the number of important targets to be neutralized; it is an old rule of tactics that

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to be simultaneously everywhere at once means to be nowhere in sufficient strength. Plans made on a scale of 1:500,000 proved that in a western theater of war, within a zone 160 miles wide by 100 miles deep, the harassing of an average of 8 to 12 communication centers suffices in order to reduce the movements of the enemy by about 50 to 60 percent (see Figure 2). Be

are blind, and without atom bomb-carrying aircraft and guided missiles the effect of atomic artillery cannot be extended in depth. Practically all action against hostile atomic artillery and rocket launching sites is conditioned by the tactical air forces—so is the protection of one's own atomic guns against enemy air attack. The entire issue of the struggle, on



hind this limit of 100 miles, the field of activity belongs to the strategical air forces.

The entire mechanism of the defense is principally based on the combined effect of atomic artillery, missile battalions, and atom bomb-carrying aircraft, and it is this core around which the conventional arms must be grouped and to which they must adapt themselves. The work of the atomic artillery and missile battalions depends much more upon the action of the air forces than upon the conventional ground forces, because without radar locating and air reconnaissance the atomic guns

the ground as well as in the air, will inevitably evolve into a contest between atomic weapons. They will become the main object of the battle, for it is logical that the side which succeeds in paralyzing the atomic weapons of the other, clears the way for the advance of its own ground forces.

Since it is in close relation with the tactical air forces that tactical atomic weapons, as used at present, would probably find their most rational form of employment, the establishment of a new type of higher unit—let us call them atomic commands—becomes an obvious necessity.

The atomic command should be organized in such a way as to include all weapons and auxiliary services required to fight an atomic battle. The atomic command might include;

1. Headquarters and staff for planning and directing the action of the command as an entirety.
2. Special units, such as radar, topographical, ballistical, and meteorological groups.
3. Air reconnaissance squadrons.
4. From 1 to 3 batteries of atomic artillery—12 to 36 guns.*
5. From 1 to 3 guided missile battalions—6 to 18 sites.
6. Combat air forces including both fighters and bombers—the latter carrying both atom and conventional bombs and rockets.
7. Infantry and antiaircraft units for the defense of air bases, atomic gun positions, and missile launching sites.
8. The necessary signal units, engineer troops, and supply and maintenance services.

Of course, the organic buildup of each atomic command—which might be subdivided into artillery, missiles, and air force divisions—could greatly vary in composition and strength, according to the features of the theater of war in which they are intended to operate. They could eventually have only a temporary character. In defensive battles, the strength of the tactical air forces should be at least equal to one-third of the attacker's airpower.

In spite of their great effect and long range, atomic weapons are unlikely to change the classical rules of strategy and tactics, but rather may alter the scale in

which these rules should be applied in the future. Therefore, atomic commands would operate in incomparably greater dimensions than the conventional army corps of the ground forces. This circumstance might not ease the necessary co-ordination between both, especially should heavy atomic weapons be subordinated to the latter. The rational exploitation of these new arms, the need for their intimate co-operation calls for the creation of centralized leadership on one hand, and on the other for a planning on a scale corresponding to their effects and ranges. In contrast to the normal army corps, the atomic commands would act in sectors with frontages of 120 to 160 miles, perhaps even more, and up to a depth of 100 miles into the enemy's rear—again according to the features of the theater of war within which all atomic commands should be subordinated to their own atomic high command.

In all kinds of large-scale operations, atomic forces might play a decisive role, thus becoming the most important units of future armies. It will be their task to prepare and to support offensive battles, to protect the open flanks of maneuvering armies, or to cover their withdrawal in case of retreat into new lines, and to support the resistance in the latter.

The deployment of higher atomic units on broad frontages does not necessarily mean that their weapons will be used all the time, similarly to the constant artillery dueling so characteristic of World War I. The high expenditure of atomic projectiles makes such an evolution rather improbable. On many sectors of the front, fighting will continue with conventional material and atomic weapons might only intervene in important battles to decide the issue with relatively small numbers of projectiles. At present, no one would be able to say how great this number will be. It might also happen that atomic commands, kept in readiness, will merely stand by, in order to use their suicidal weapons—

* The organization of atomic artillery batteries per 12 guns seems to be the best solution. Normally, each battery would support one army of three conventional army corps, while each army corps would be supported by a troop of four guns. Each battery is controlled centrally. Topographical, ballistical, and radar spotting groups would be equipped with helicopters, the same means being used for quick reconnaissance of gun positions. Missile launching battalions should work on similar lines.

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Conventional Ground Forces

Without adequate protection, the atomic command's positions would be left suspended in midair. Therefore, ground forces will be required in order to protect them by a barrier. Some readers may ask: "In view of the enormous effect of atomic

the mere existence of a continuous barrier, the enemy is forced into concentration, becoming, thereby, a paying target for atomic weapons.

How should the front of the ground forces be constructed? To answer this question, let us first state that an atom bomb or shell with an effective radius of about 2 miles covers an area of 12.56 square miles. However, when a disposition

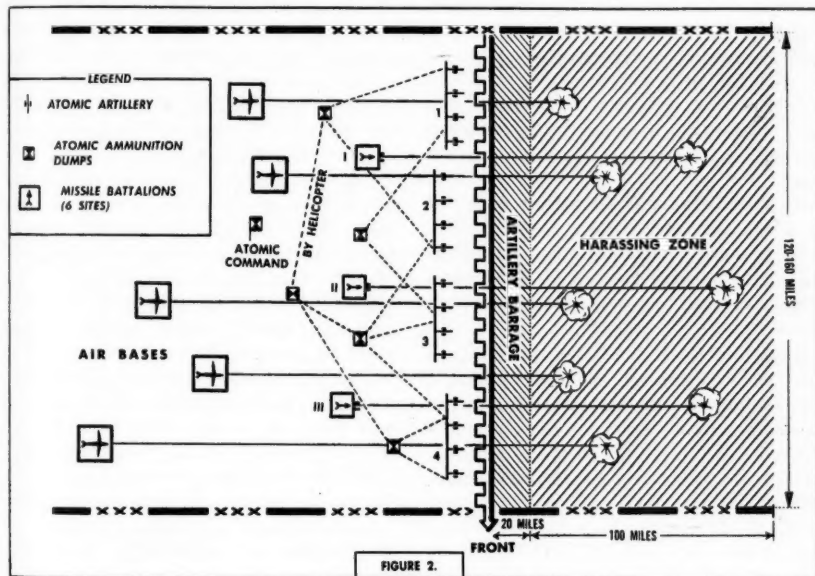


FIGURE 2.

weapons, is it really necessary to use ground forces in number?" It is not difficult to answer this question. Without a continuous front, an enemy may easily attempt a massive infiltration, advancing on a wide frontage, cross country, and submerging the positions of the atomic command and the weak forces protecting them. Against such a dispersed invasion, atomic weapons would be of little avail. On the other hand, in order to break through a continuous front, the attacker is obliged to concentrate his forces, thus becoming vulnerable. In other words, by

—whether offensive or defensive—is articulated to a depth of 1 mile only, then the real surface of the target is reduced to about 4 square miles. Does not that mean that tactical forms organized in broad lines could reduce the effect of atomic weapons to one-third of its maximum? In attack, a deep articulation will be more difficult to avoid, as offense must be deployed from depth. However, a 1-mile deep belt of ground forces may be solid enough to bring to a standstill an attack the impetus of which has been reduced by atomic bombing and atomic shelling.

However, in order to lend a more solid depth to the defense, it is proposed to organize three or more successive belts, each about 1 mile deep. In World War I, it was said that successive defense lines should be sufficiently distant from each other that the attacker could not reach them from the same gun positions. Here, in atomic warfare, the distance between the lines should be sufficiently great that two cannot be affected by the same atomic projectile. Of course, when marking out defense positions, account will have to be taken of such conventional factors as suitable field of fire, easy camouflage, and good observation. An additional condition will be that the configuration of the terrain chosen for defense should offer at least partial protection against atomic weapons. In atomic warfare, natural obstacles may be of greater importance than ever. It is difficult to imagine how an attacker could cross a river if his immediate rear were covered by heavy atomic fire.

How are these belts organized—deep trenches everywhere, dugouts, pillboxes and shelters, protected by barbed wire, minefields, and all kinds of other obstacles? The spade will again become as indispensable to the infantry as the machineguns, the mortars, bazookas, and recoilless guns. Here and there, small packets of tanks are dug in and as carefully camouflaged as other parts of the position. Some batteries of normal artillery are also built into this system. Their task consists of shelling areas which, for reasons of safety, cannot be covered by atomic shells, and also to prolong in time or to complete the effects of atomic weapons, to support local counterattacks, and to deal with special targets, such as shelters or pillboxes.

The main strength of the defense will be concentrated in the first belt. The principle is to cling as narrowly to the enemy as is practically possible. Therefore, the "no man's land," as well as the position of the advanced posts, should be reduced

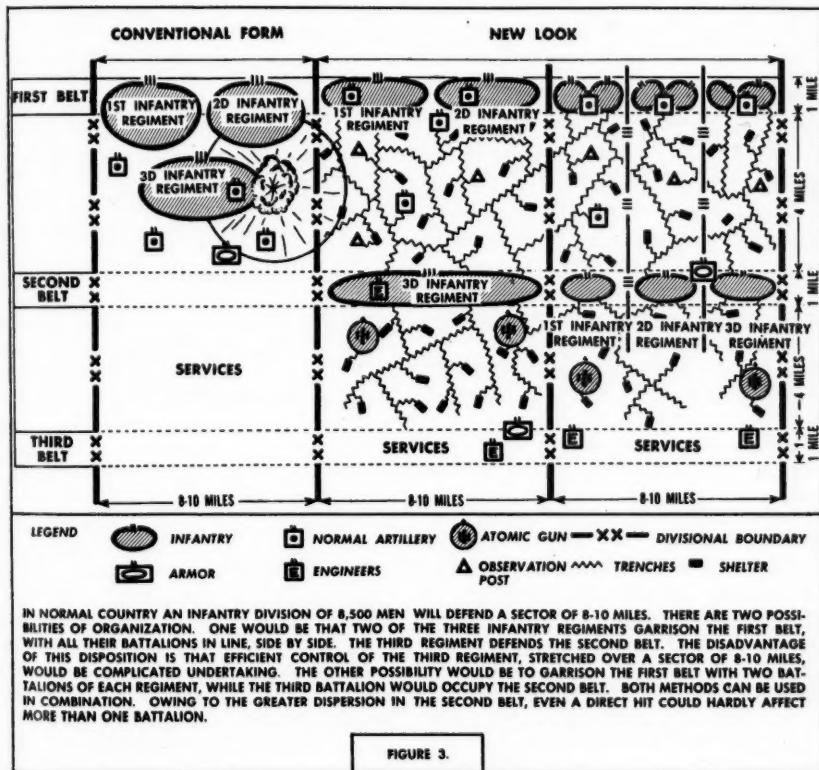
to a minimum. The more the two sides are entangled with each other, the smaller the probability that the attacker, because of his own troops' safety, will use atomic weapons against the first belt. Such close contact, such mingling of both sides could, in certain cases, be furthered by tracing the position in zigzag form. In World War I, the Germans succeeded several times in escaping the murderous preparatory fire by simply evacuating their first position. This method could, perhaps, be used in a reverse sense. In certain cases, probably under cover of darkness, the attacker may suddenly break contact and retire in order to use atomic weapons in preparation against the first line. Normally, in spite of all his precautions, such movements will hardly escape radar detection. In any case, the forestallment against this or similar tactics necessitates constant alertness on the part of the defense, whose tactical reserves must be kept in readiness and able to follow at the enemy's heels by moving forward with sufficient strength almost immediately. As the evacuation of the first position by the attacker may easily be a sign of an imminent offensive, the atomic artillery of the defender should, without delay, concentrate on the supposed jumping off bases of the attack.

However, the application of such defense tactics will not always be possible. When both sides are separated from each other by an important obstacle—such as the Elbe or Rhine—it would be difficult to follow immediately an enemy suddenly evacuating his forward zone. The old rule, that an obstacle can only be forced with difficulty if it is kept under fire, might also retain its validity in atomic warfare. The problem is to know with what kind of weapon this should be done—atomic or conventional? The former is a thousand times more powerful. Therefore, would it not be logical to site the forward limit of the defense position about 6 to 10 miles behind the river, in order to keep both

banks, especially at the crossing points, within the range of the atomic artillery?

Speaking from a general point of view, tactical situations which heretofore were exceptional may frequently become normal in atomic warfare. As it can be advantageous—according to terrain and other circumstances—to keep in close contact with the adversary, in certain cases the

form of approach march—a form whose basic principle would be to avoid the fire of the adverse atomic artillery as long as possible, while at the same time assuring the entry into action of his own atomic guns at the earliest possible moment. There is no doubt the chances of success will largely favor the side which first succeeds in making use of his atomic artillery.



security of the ground forces in defense might be enhanced by an alternative solution—that is to say by an abnormally deep “no man’s land” of about 10 or more miles. In such an eventuality the attacker would be forced to employ an entirely new technique of concentration, as well as a new

The stages of a defensive battle are, then, roughly as follows: It is the function of radar detection and air reconnaissance to determine the intentions of the enemy. Tactical air forces, in conjunction with missile battalions, hamper his movements on the lines of communication.

Those attacking forces, which succeed in getting through the successive barrages as far as the jumping off area of the offensive, run into the fire zone of the atomic artillery. However, should they, nevertheless, succeed in launching the offensive, then it is the task of the three successive belts of ground forces to stop their advance altogether. The entire system functions like a deep filter. Seen on a magnified scale through the eyes of World War I, one may say that atomic bombing by the tactical air forces and missile battalions takes over the rule of the former artillery barrages; atomic artillery, the task of the machineguns.

Although the positions of the ground forces are comparatively thin, the depth of the defense extends, in fact, to about 100 miles. Therefore, the attacker is compelled to deploy his forces much sooner, which means maneuvering them in fractions, on broad frontages. Without concentration, however, the attack can have no piercing power, yet every concentration inevitably becomes a highly vulnerable target for atomic weapons.

In the last two wars, it was only within the range of the normal artillery and machinegun fire that troops were forced to operate in thin formations—clinging to the ground, using every bit of cover, and digging foxholes. Modern technique has, however, increased the power and range of firearms to such an extent that in the future entire armies might be compelled to disperse while still very far from the battle area proper, approaching the front "crawling on their stomachs" and enhancing their security by digging themselves in whenever possible.

The eventual employment of atomic weapons heavier than the present ones in

use could only accentuate the above mentioned characteristics of ground fighting in defensive battles by provoking still greater dispersion. The picture would not be altered essentially by the massive introduction of small atomic projectiles. By using lighter atomic artillery—such as 120-mm or 90-mm caliber—one might possess the advantage of adapting the fire more elastically to the characteristics of the targets. This would logically lead to a more rational exploitation of the available firepower. In other words, the effect of four 5-kiloton shells would be incomparably more devastating than, for example, that of two 20-kiloton bombs.

The smaller radius of destruction of lighter calibers would have the further result of reducing the safety zone. This would allow a more intimate co-operation with conventional ground forces and the support of even local attacks or counterattacks with atomic weapons. Of course, the range of light atomic ordnance would be more restricted in the case of a 120-mm gun in the neighborhood of about 10 miles. Smaller ordnance would, however, be more mobile and could consequently be attached directly to field formations. In such a case, the heavier types of tactical atomic weapons would still not lose their *raison d'être*. Their task would be to fight the long-range battle, while within such a framework the light atomic guns would become the principal weapons of the ground forces in their atomic close-range combat. Heavy atomic ordnance, with longer range, will always remain essential so long as the technique of guided missiles has not yet achieved the same reliability and precision as that of the artillery. No matter from which angle one considers the problem, the lighter atomic weapons will also favor defense rather than attack.

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WARTIME ROLE FOR COLLEGES AND UNIVERSITIES

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THIS article is an effort to determine the role which colleges and universities should play in an all-out war.

Review of past experience in this field emphasizes the need to develop a clear-cut policy for wartime utilization of our institutions of higher learning. Instead of waiting until the emergency arises, and then groping through fog in belated effort to determine the best way to enroll them in the struggle, prudent leaders will study the problem while there is yet time for careful analysis and debate. Once determined, the policy should be explained to all interested parties—to the military, to our civilian leaders, and to our educators. Each must then do necessary advance planning. Only thus can acceptable efficiency be obtained. Today, Mars rides in jet planes, impatient at delays and lost motion which past isolation permitted.

It is necessary first to determine what kind of war is being discussed, and next, histories of past wars to be studied so that past mistakes may be avoided and past successes exploited. Passing from past to future, certain military requirements for college training and facilities will exist; these require analysis. Finally, nonmilitary educational requirements need to be anticipated.

Much discussion and debate will be required before a final policy can be determined. Despite its very real importance, the subject has been sadly neglected. It is hoped that this article will stimulate and, in some small way, guide this necessary discussion and debate.

What will the next war be like? Will we be faced by a true struggle for survival, as Great Britain after the fall of France in 1940? Or, will we be able to provide both guns and butter, as we did following Korea? To a major extent, the role which our colleges and universities should play depends upon the answers to these questions.

War has a nasty habit of defying prediction. Campaigns seldom go "according to plan." Axioms proved in one war, as the power of the defense was proved in 1914-18, may turn out to be false in the next.

There do, however, seem to be several

Colleges and universities are the keystone in a strong educational system. Past experience emphasizes the need for the wartime utilization of these institutions should we become involved in an all-out war

features of the next war which can be predicted with reasonable certainty. One is the mobilization of manpower if the early attacks are not decisive and an all-out struggle ensues.

As mobilization progresses, there are very important changes in the nature of military manpower requirements; these affect the role of colleges and universities. During the first few months, the greatest need is for trained individuals to bring existing units up to strength. As an illustration, the typical National Guard division has most of its officers and key non-commissioned officers, but less than half of its total enlisted strength. In normal times, each Regular Army division is several thousand short of full strength. With proper management, the trained reservists mentioned above should fill the most urgent portion of this early requirement.

In addition to the early demand for trained replacements, there comes a demand to provide new units—either by calling in units from the civilian components, or by creating new ones. Properly managed, the 155,000 trained Reserve officers immediately available to the Army, and corresponding reservists in the Navy and Air Force, should fill much of the officer demand during the early part of this buildup phase. Many enlisted spaces can be filled in a similar manner. Extensive programs will, however, be necessary to retrain those out of the service more than

a year, and to train new technicians. In a technological war, the military must have men able to operate and to repair complicated equipment in the mud, rain, snow, and dust of combat.

After about 2 years of war, the buildup phase will end. Officer spaces and technician spots will be filled. The training problem will change radically at this time, as emphasis shifts to the training of men to replace battle casualties. The bulk of these casualties will come in the ground forces, and normally about 80 percent of ground force losses are infantry losses. Thus, after about 2 years of war, military requirements for new manpower will find infantry platoon leaders and infantry privates preponderating. There will be surprisingly little demand for additional technicians. This fact is hard to get across to laymen, but no college training program can claim to serve military requirements unless it fits into this situation.

Thus, we see that, in all probability, the next war will find both the United States and her enemies scourged by atomic attack. Our survival as a nation will depend upon the skill and speed and determination with which we recover from this destruction. Past experience gives little to guide us as we contemplate the "survival economy" which will result. Our institutions of higher learning can make very important contributions; none can doubt that they will devote themselves wholeheartedly to the struggle. The present need is to determine how best they can serve.

Wartime Experiences

In studying the role to be played by colleges and universities in this kind of war, the next step is to review past experiences.

Histories of the Civil War tell vividly about entire classes marching *en masse* to serve the Confederacy. In the North there were few such cases. At Princeton,

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for example, the orderly procedure of college exercises was not materially affected during the 4 years of war. Male enrollment at Oberlin College fell off 40 percent during the first 2 years of the war, but rose thereafter.

Prior to and during the Civil War there was a movement to improve opportunities for higher education in the newly formed western states. On 2 July 1862, the famous law was passed establishing what are now known as the land grant colleges. This law provided for:

The endowment, support, and maintenance of at least one college in each state to teach such branches as related to agriculture and the mechanic arts . . . and including military tactics . . . in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life.

This was supplemented by the act of 28 July 1866, which authorized the detail of Army officers as instructors at those colleges for the purpose of "promoting a knowledge of military science of the United States."

These two acts form the statutory base both for the State University and for the Reserve Officers' Training Corps (ROTC) as we know them today.

World War I

World War I found the colleges playing a more important part. As early as 10 February 1917, they organized in Washington an Intercollegiate Intelligence Bureau to help locate trained men for government jobs.

Declaration of war—on 6 April 1917—found the country without a definite military policy. For the initial period, volunteering was the only possible means of raising an army, and thousands of high-spirited college men rushed to the colors. Later, the War Department took steps to recover these trained men from the ranks, and public statements by the President and

others urged against depopulation of the colleges.

A general meeting of college representatives was held in Washington, on 5 May 1917, and full support was pledged the war effort. Use of college facilities to train men for the military commenced 17 May 1917, with initiation of aviation cadet training, and grew steadily thereafter. Beginning 4 September 1917, five enlisted Reserve corps—medical, engineer, veterinary, signal, and quartermaster—were organized by the Army. By the summer of 1918, more than 34,000 enlisted men were being trained by the colleges in some 20 basic trades.

This training was of a vocational and trade nature, rather than collegiate level. Most of these courses lasted 2 months. Nearly 95,000 received this training. Despite the vocational level of the courses, the colleges gave wholehearted support.

On 6 May 1918, the Student Army Training Corps (SATC) was announced. It was formally inaugurated at more than 400 colleges on 1 October 1918, and ultimately included some 516 units. The program had two parts: Section A covered collegiate work; Section B covered the vocational training described above. All students were enlisted in the Army; provision was made to call them away from the colleges for active service in the same proportions and at the same periods as other men of comparable age were drafted. On 26 November 1918, the War Department announced its decision to demobilize the SATC within 2 months.

It should be noted that during its short history the SATC was handicapped by the influenza epidemic.

With regard to research and development, college and university facilities were not fully utilized. Inquiry by the Bureau of Education elicited the fact that only about 40, from a total of 216 institutions replying, were carrying on research work of any type on war problems.

World War II

Again in World War II, the colleges and universities were prompt to offer their services. In 1940, a National Committee on Education was organized under the auspices of the American Council on Education and the National Education Association. In October 1940, the colleges were called upon to provide training in specific fields. For a population scarcely recovered from long years of depression, short courses in Engineering, Science, and Management Defense Training (ESMDT) were authorized. Students were given free tuition but provided their own subsistence and supplies. Participation was limited to public or tax-exempt, degree granting, institutions. Students were required as a minimum to be high school graduates. In practice, a large majority took these courses as a form of inservice training.

Later renamed Engineering, Science, and Management War Training (ESM-WT), this program trained more than 1,300,000 men and women by January 1944. Some 12,500 short courses were offered in 1,000 towns and cities by over 200 colleges. Students took courses as follows: 356,000 in engineering, 14,000 in chemistry, 9,000 in physics, and 120,000 in production management. A total of 21 percent of the students were women.

On 3 and 4 January 1942, with Pearl Harbor still a fresh memory, the colleges and universities sent representatives to a conference in Baltimore to discuss the problems involved. This conference was sponsored by the National Committee on Education and the United States Office of Education. The conference pledged the total strength of the colleges to support the war, and recommended that courses be accelerated. Some 600 colleges changed their schedules to implement this recommendation. In general, they adopted a 48-week year, with a 6-day week. The general result was to make graduation possible in 3 years or less. Some qualified high school

students were admitted before graduation. Students and faculties experienced some difficulties as a result of acceleration. Students depending upon vacation earnings found themselves in financial difficulties; faculties found their workload greatly increased with little or no increase in salaries.

In the spring and summer of 1942, when the draft age was still 20, many requests were made to the War Department to expand the ROTC. This was opposed by those training our combat soldiers, because the need for officers and noncommissioned officers was acute at that time. The ROTC graduates would not become available until after the period of acute shortage. The ROTC units continued to operate throughout the war, but the basic ROTC, covering the first 2 years of college without specialization in technical fields, was all that survived. Numbers of cadets dropped to a fraction of prewar figures.

In September 1942, lowering of the draft age from 20 to 18 was anticipated. The Secretary of War then approved plans for the specialized training of selected enlisted men, using the resources of colleges and universities. This program, known as the Army Specialized Training Program (ASTP), was established primarily to ensure a continuous flow of technically and professionally trained men. At first, it was contemplated that most of these men would become officers.

The program did not match a specific need for such men at the time they would complete their training—a fatal error, as events were to prove. It was strongly opposed on strictly military grounds by Lieutenant General Lesley J. McNair, who commanded Army Ground Forces and was responsible for training combat soldiers. General McNair argued that it would take key, high-grade men from units needed in combat, and would compete with the Officers' Candidate Schools (OCS). He expressed the feeling that the Army had

enough college trained men to last until 1944.

Formal announcement of the ASTP, and of the corresponding Navy College Training Program (NCTP), came in December 1942. Selected candidates were to be in uniform, receive pay, and be subject to military discipline. They were to receive basic military training before starting college work.

Curricula for the ASTP were prepared with the immediate objectives of the Army in mind. They included mathematics, physics, chemistry, premedical and medical, engineering, area studies, and similar subjects. After preparation, these curricula were subject to review by an advisory committee of six college presidents.

The academic year included four 12-week terms. At the end of each the disposition of men in the program was considered, with some continuing their studies, some going on to OCS, and others going back to the troops.

Selection tests were first given 12 April 1943. Initial requirements called for a score of at least 110 on the Army General Classification Test (AGCT), for graduation from an accredited high school, and for completion of a minimum of 9 weeks of basic military training. Age limits for the basic ASTP course were 18 to 21 inclusive. Candidates for the advanced course had to be at least 18 years old, and to have at least 2 years of work in a recognized college or university. Later, the required AGCT score was raised to 115, and arrangements made to accept the results of tests administered by the College Entrance Examination Board.

The ASTP reached its peak in December 1943, when 380,000 trainees were enrolled in 489 institutions. Men began to return from the ASTP to troop units in the late summer of 1943. By that time the major buildup of the Army was over, and most officer and specialist jobs were already filled. Except for engineers, these grad-

uates were too specialized for exact assignment in the combat arms, yet the need for intelligent combat leaders was too great to permit their assignment exclusively to service troops. There was a grave shortage of combat replacements to replace the battle casualties experienced. At the same time, a crisis existed in the infantry units being readied for movement overseas—a crisis caused by draining off high-score men for ASTP and other training programs, and by wholesale transfer of infantry privates to the replacement stream. Under these conditions, the ASTP was cut to 35,000 by 1 April 1944, leaving mostly those in advanced medicine, dentistry, and engineering. A total of 64,332 men were graduated by ASTP between April 1943 and December 1945.

The ASTP made positive and worthwhile contributions to victory, but in balance it fell short of possible achievements. The basic fault was failure to supply the type of man needed at the time he was needed. Instead of determining the number of officers the Army would need during future periods, designing curricula to prepare for those specific positions, and limiting enrollment to the numbers required, the program undertook to train technical men who "ought" to be needed. Just as the hunter who fires at a flock of ducks, with no specific target, often goes hungry, so did ASTP miss its target in many cases. When the replacement crisis arose, the program was vulnerable, and became a casualty. It should be noted that the language area studies, engineering courses, and medical courses did in most cases fill specific military needs.

For many of its trainees, ASTP resulted in disillusionment. They were given at least implied promises of commissions, yet were suddenly withdrawn to serve in the ranks. Had they not been sent to college, many would undoubtedly have gone to OCS and become officers. Understandably, civilian educators participating in the program

found it difficult to understand the abrupt termination of their efforts.

These failures—if failures they be—should serve to emphasize that training programs adopted in time of war will surely fail unless they meet directly an urgent, specific, wartime need.

As a successor to ASTP, the Army Specialized Training Reserve Program was announced 3 March 1944. It was a program for training 17-year-old civilian high school graduates.

The Navy College Training Program (NCTP)—often spoken of as V-12—was announced at the same time as the Army's ASTP. It took over those men in the enlisted Reserve already in college in civilian status under the V-1 and V-7 programs. Admission was open also to qualified enlisted men on active duty, and to civilians who could meet requirements. In April 1943, a total of 123,206 applied; only 16,000 were accepted.

The V-12 program became an integral part of the Navy's long-range program to procure Naval Reserve and Marine Corps Reserve commissioned officers. It sailed a course more steady than that followed by ASTP, although there was a progressive 25 percent cutback in 1944. A total of 219,150 men were graduated under NCTP.

An idea of the magnitude of these two programs—ASTP and NCTP—can be gained from the fact that, during its 3 years of existence, the Joint Army-Navy Board for Training Unit Contracts expended more than 300 million dollars.

As the war progressed, draft deferment policies for students became tighter. By 1943-44, deferment was limited to students taking courses directly preparing them for critical occupations in essential industries. In general, students in scientific or specialized fields such as engineering, chemistry, physics, and medicine, were the only ones being deferred. Civilian male enrollment dropped to about 30 percent of the 1939-40 base. Much, if not all, of this drop

in undergraduate enrollment was made up during the postwar enlisted man bulge. However, one lasting effect of deferment policies was the drop in numbers of graduate students. In 1945, for example, only 40 percent as many science doctorates were granted as in 1941. This loss has not been made up during the postwar years, and a recent study concluded that the loss from World War II was at least 10,000 doctor's degrees in science. In our present technological race with the forces of communism, this is a serious shortage indeed. In 1950, the United States had only 40,000 men and women with such training.

In the important field of research and development, the colleges and universities were far better employed than in World War I. Many crucial developments had their genesis in university laboratories—witness, for example, the atom bomb. A survey made toward the end of 1942, by the National Academy of Sciences, at the request of the War Production Board, showed that university laboratories had all but 28,000 hours per week of research workers' time, or the equivalent of 700 men at 40 hours per week, already engaged in war work. This was substantially full use of available facilities.

Summary

In summary, our institutions of higher learning played an important role on the stage of world conflict in the years 1941-45. They gave generously of their time and facilities to meet the training and other demands of the armed services. Certain fundamental mistakes in emphasis on the part of the Army kept this contribution from reaching its full potential value; this experience should serve as an important guide in any future emergency. Training for the Navy did not suffer as much from such mistakes as did the Army program.

The services rendered by our institutions of higher learning were, for the most

part, *short-range* services, designed to contribute directly to the early defeat of a great opposing military force. Enduring educational objectives were, of necessity, subordinated to the life-and-death struggle of the time.

Korean Conflict

On 25 June 1950, the clouds of war muttered ominously as open conflict broke out in Korea. For months it appeared that World War III might well be under way. Once again the colleges and universities sprang into action. The American Council on Education called a conference in Washington 9 July 1950. In attendance were representatives of national organizations concerned with higher education and having headquarters in Washington. Present also were representatives of the Department of Defense, National Security Resources Board, Office of Education, and Selective Service. Steps were taken to study the possible effect of mobilization upon colleges and universities, and to call another meeting within a month.

At this second meeting, steps were taken to increase the membership of the Committee on Relationships of Higher Education to the Federal Government, and to convene a national conference of representatives of higher education and of government. This latter conference was held in Washington, D. C., 6-7 October 1950, and was attended by approximately 1,000 educators, representing some 600 colleges and universities. Their General Resolutions, repeating the declaration made at the 1942 Conference on Higher Education and the War, pledged to the President of the United States their total strength—their faculties, their students, their administrative organizations, and their physical facilities.

The question of student deferment policies received very lively attention at the conference. On the day before the conference opened, six Scientific Advisory Com-

mittees, appointed in the autumn of 1948 by the Director, Selective Service System, to advise concerning deferment policies, had submitted a set of recommendations. Out of these came the deferment policies still (April 1954) in effect, under which talented students are deferred until completion of their studies, without granting permanent exemption from military service, and without regard to the courses being taken. Many of the members of these committees were present at the conference, and the committee recommendations were incorporated in the conference report. In his address to the conference, Major General Lewis B. Hershey, Director, Selective Service System, referred to the committees as "your scientific advisory committees." The first *declaration* in the General Resolutions expresses the strong feeling of the educators that a properly safeguarded student deferment policy is in the national interest, and their strong opposition to any policy basing student deferment on courses or curricula leading to specific professions or vocations.

Events proved unfounded the fears of 1950 that a new, all-consuming world war might already be under way. The colleges and universities have continued, albeit with some difficulty, to serve long-range, enduring educational objectives. They have continued also to render important service through ROTC programs and in their laboratories. The magnitude of their contribution in the field of research and development is indicated by the fact that approximately 150 million dollars were paid them during Fiscal Year 1952 for work on research contracts for the Department of Defense. The status of their contribution in the educational field is indicated by the fact their enrollment in the fall of 1953 stood at 2,250,000 as compared to 2,456,000 in the fall of 1950, although large numbers of veterans were still present in 1950.

In moving from past to future contri-

butions by colleges and universities, we must keep in mind the near certainty that this future war will be a struggle for actual survival. Death and destruction will strike our homes, our cities, and our factories. Nothing short of all-out effort will suffice.

Requirements

Under these circumstances, it seems certain that our colleges must, once again, accelerate their schedules to permit concentrated study 12 months a year. Soldiers in their foxholes and workmen in factories will cast aside the 40-hour week, and the scholar must equal their effort.

Education can survive under future wartime conditions only as it meets definite requirements for trained men and women. There are such requirements. The Armed Forces have certain needs, predictable with reasonable accuracy. The country has certain additional requirements: these we must foresee as accurately as possible.

First, let us discuss military requirements. In considering them, the time element is of prime importance. Even with accelerated schedules, a student entering college after war starts cannot become available to the Armed Forces for 30 to 36 months. (Those already in college will, of course, become available sooner.) As stated earlier, the greatest military requirement for additional trained men comes in the first 24 to 30 months of the war. Probably the greatest military need is for trained and competent leaders.

Armies, navies, and air forces provide the severest possible test of leadership. This is true particularly in small units, where a single officer must personally lead a group of tired, often scared, men through the smoke and confusion of battle into direct personal contact with the enemy. The natural leader is the real specialist of the Armed Forces. The man who can control and develop his platoon or crew or squadron under training conditions, and then

take the same element into battle and conserve its powers with complete efficiency, is the most important man in the service.

Many efforts have been made to define leadership, and to describe the training needed by military leaders. One of the best is the following statement by General C. B. Cates, when he was Commandant of the Marine Corps:

Leadership is intangible, hard to measure and difficult to describe. Its qualities would seem to stem from many factors. But certainly they must include a measure of inherent ability to control and direct, self-confidence based on expert knowledge, initiative, loyalty, pride, and a sense of responsibility. Inherent ability obviously cannot be instilled, but that which is latent or dormant can be acquired. They are not easily taught or easily learned. But leaders can be and are made. The average good man in our service is and must be considered a potential leader.

Here is a usable outline of the objectives which must govern the bulk of college level wartime education for the Armed Forces. Potential students must be screened to select those with inherent ability to control and direct other men. Those who qualify must be given an education which will develop this inherent ability, and which will also impart the other ingredients of leadership. Except for specialized training, to be discussed later, college level education which fails to meet this requirement cannot argue that it has direct military value.

The prescription is far easier to write than to apply. Selection procedures of today leave much to be desired in their ability to identify and measure inherent leadership qualities. Much additional research is, then, needed in this field.

Present college curricula serve many diverse ends; few place major emphasis on leadership as an end by itself. Most college students aspire in a vague way to ultimate positions of leadership in their

community, but with some exceptions their immediate goals are jobs as engineers, lawyers, teachers, and so on. Probably the two service academies, at West Point and Annapolis, have given more thought to this requirement than any other institutions of higher learning; educators should study their wartime curricula as guides for their own mobilization planning.

Many volumes have been written discussing the relative merits of general education and specialized education. The ideal objectives of general education have been best stated, by the Harvard Committee on the Objectives of a General Education in a Free Society, as the developing of abilities in effective thinking, communication, the making of relevant judgments, and the discrimination of values. These are remarkably similar to the leadership requirements quoted above, although they do not mention the ability to direct and control other men.

Specialized education in today's complicated world tends to teach more and more about ever narrower fields. In its ideal form, it does a splendid job of training engineers, scientists, doctors, lawyers, and other specialists. With many shining exceptions, scientists and other specialists do not as a class excel in inspirational leadership of men.

Thus, it appears that the military requirement for trained combat leaders can be filled better by the product of general education than by specialists; requirements for technical specialists are discussed under the next subtitle.

Essential combat skills do not lend themselves to study on the college campus. An infantry platoon leader, for example, must fire many types of high-powered weapons, and go on many practice patrols under simulated battle conditions, before he is qualified to lead men into battle. This part of his training must be given at Army camps under strict military discipline.

This raises the question whether combat

officers should come from OCS or from ROTC.

During the buildup phase of a mobilization, additional officers must come first from already trained Reserve officers, and next from OCS. Time will not permit the use of colleges, which require more than 30 months to complete a training cycle, as the major source of officers during this phase. The present Army OCS covers a total of 968 hours of instruction. Experience has demonstrated that when this course is taken under the grim compulsion of war, with death, or rather survival, as a factor in learning, and with an officer's commission as the immediate reward for success, graduates are superior as combat leaders. In contrast, ROTC graduates, with 480 hours of campus instruction, spread over the entire college course, plus 288 hours in summer camp, require additional training before they can be sent into battle. One very important factor is the difference in psychological tension between an OCS camp and a college campus.

This dependence upon OCS has the additional advantage that it gives qualified enlisted men the opportunity to compete for commissions.

Full dependence upon OCS, without any utilization of colleges to train potential officers, would ignore the very real advantages of a college education as preparation for life in the world of today. In wartime, the services can use large numbers of junior officers whose abilities are limited to the battlefield, but they must have a very substantial leavening of officers whose horizons extend beyond actual combat. Today, less than half of the Army officers on active duty are college graduates. (A study of officers on active duty 27 March 1953, prepared by the Career Management Division, Office of The Adjutant General, showed that 25 percent of all Army commissioned officers on active duty had no college education, and 30.2 percent had attended college but not graduated.) This

proportion is particularly low in the infantry, armor, and artillery, where only 42 percent are college graduates. Addition to this base of large numbers of OCS graduates—predominantly not college men—would leave this vital portion of the Army dangerously low in this respect. Air Force figures are even lower than those for the Army, because for years the flying training program has accepted applicants with 2 years or less of college. The Navy has a higher proportion of college graduates.

In an ideological war, this shortage of all-around officers in the Army and Air Force would be serious, because as a rule the broader background of the college graduate gives him a better understanding of the ideological issues involved.

Thus, sound personnel planning will call for wartime education by the colleges of large numbers of potential combat troop leaders. In selection of men for this training, leadership must be the paramount requirement. Other qualities normally required for college admission must follow. Some way must be found to eliminate financial means as a requirement—we cannot afford to limit our selection to the sons of well-to-do parents.

Scientists and Technicians

This emphasis upon combat leaders must not obscure the requirement for large numbers of engineers, scientists, and doctors. In this technological war, the armed services will have a tremendous requirement for professionally trained men. In the process, recognition must be given the fact that technical service officers are troop leaders as well as technicians. Leadership training must be emphasized, along with technical subjects.

Traditional peacetime curricula cannot be accepted without change, even in such technical fields as engineering. Men being trained for the armed services will, in large part, be deferred from combat military service on the basis that they are be-

ing trained for the military. To meet military requirements, curricula need certain changes. For example, an Army engineer must know how to use Bailey and other military bridges. He must know field expedients not widely used by civilian engineers. He must know how to lay out fortifications, and how to blow up bridges and other structures. Many other changes in emphasis will appear on close comparison of present curricula with specific military job requirements.

The numbers enrolled for both types of college level training must be limited to specific military requirements; otherwise the 1944 ASTP experience will surely be repeated. In 1941, the Army had no real experience on which to base forecasts of personnel requirements. Today, with World War II and Korea as background, the armed services should be able to predict their needs with acceptable accuracy.

In addition to trained officers, the armed services have a tremendous requirement for enlisted specialists. This need will be particularly large during the 2 years or so of buildup; thereafter it will drop to a level matching losses.

The armed services are already training such specialists, and have well-developed curricula and training procedures. Much of this instruction could, if necessary, be given on college campuses.

In many cases, present mobilization planning contemplates opening additional schools to handle expected increases in student loads. Each additional service school will require overhead personnel on a ratio of about 650 staff per 1,000 students. These additional instructors, mess and supply personnel, and administrative personnel must be organized and trained at a time when the over-all training and personnel loads are most critical. Most of them will be released for other duties as the training load decreases.

The colleges should be asked to assist in this training, as they did in previous

wars. Although naturally reluctant to change drastically their type of instruction, there is every reason to believe that, as a patriotic service, they would meet military requirements. Military leaders like to keep such training under their own control; the extra manpower and other costs of such a policy cannot be condoned in an all-out emergency.

ROTC versus ASTP

In World Wars I and II, college training programs involved bringing students into the service, giving them certain military training, and then sending them to college in military status.

This procedure is exceedingly expensive, with its real cost little understood. The total of all personnel costs, including such items as pay, allowances, food, clothing, medical care, and so on, is in the neighborhood of \$5,000 per man per year. Mere dollar cost is bad enough, but these figures are only one indication of the real cost in manpower and natural resources to keep a soldier in uniform. To this must be added the very real cost in later years of various veterans' benefits.

Is this cost necessary? To answer, it is necessary to review the training objectives and the arguments for military status.

The primary objective is, of course, to train potential officers or enlisted specialists. This must be done under heavy pressure, with maximum use of the motivation resulting when students see the direct application of things being learned. It must be done in a way that will keep morale high. It must avoid discrimination in favor of boys from well-to-do homes. In the process, colleges are entitled to fair reimbursement, both for tuition charges and for overhead costs. All these objectives can be met by placing students in uniform.

For officer candidates, they can be met also by a variation of the Naval Reserve

Officers' Training Corps (NROTC) plan, sometimes called the "Holloway Plan." This might take the following form:

Students could be enrolled after competitive tests similar to present NROTC tests. They could be required to sign an agreement to serve on active duty after graduation, although the war might end while they were in school. Their tuition could be paid, and an additional payment made to cover overhead costs. A subsidy (currently \$50 per month for NROTC) could be paid the student, to cover food and other expenses. Uniforms could be furnished, as for NROTC, and, if deemed necessary, students could be required to wear uniforms at all times. Students failing, or dropped for other reasons, could be reported to Selective Service as available for induction. It should be noted that this plan would require new legislation.

Such a plan would meet essential objectives. It would hold costs to a reasonable minimum. It would permit major savings in overhead to handle cadet administration, releasing some overhead personnel for combat duty. By holding cadets to the terms of their agreement, the services could gain some protection against loss of key personnel in hasty demobilization following any sudden end to hostilities.

This plan would also facilitate the maintenance of academic traditions, and would offer some safeguard against arbitrary action to cancel the program and call students into the ranks, with consequent waste of talent.

The chief drawback of such a program would be the indisputable fact that military authorities would have less control over students, and less freedom to use them elsewhere in case of emergency.

For enlisted technicians there does not appear to be any acceptable substitute for military status. These students are required to meet certain military prerequisites before they can qualify for such train-

ing. Their stay will be much shorter than that of officer candidates.

Any program training college students for the military must be policed, to see that each service gets an equitable portion of the most desirable students. There is at least a suspicion that, in World War II, many steps in the establishment and administration of the ASTP and NCTP programs were influenced by competition for high-grade men. In recent years, there has been constant argument over the relative needs of the Army, Navy, and Air Force for such men. Unless firm control is established from the start, the program will be torn by dissension over this point.

Research and Development

Although vitally important to victory, the role of college laboratories and of the scientists on college faculties is so widely recognized and acclaimed that lengthy discussion here would be redundant. It is mentioned only to complete the listing of college contributions. Research agencies of the Department of Defense are already making extensive use of available college facilities. In war it can be assumed safely that both the colleges and the military would expand this program to the maximum.

In summary, the military requirements to be met by colleges and universities in the next war are very large and very important. Leaders must be trained; scientists, engineers, and other specialists must be given professional training under heavy pressure; enlisted specialists must be trained during the buildup phase of mobilization.

Present planning for this requirement is disjointed and unimaginative. Neither the Department of Defense nor the educators have prepared realistic plans for the employment of colleges and universities during a full-scale war. Without such planning, inexcusable confusion and waste motion would surely exist in the vital opening months of conflict.

Long-Range National Objectives

The basic reason for fighting a war at all is our determination to preserve American ideals, standards, and "way of life." Our kind of political, social, and economic system is on trial today; open warfare will be merely a further stage in this trial. Probably it will not be the final stage. Unless we can preserve those things essential to achievement of our long-range objectives, there is little reason for fighting.

What are these long-range objectives, and how important are the institutions of higher learning in their pursuit?

In declaring our independence, we held that all men are created equal, and listed "Life, Liberty and the pursuit of Happiness" as among the inalienable rights of men. We are dedicated to the continuation of a form of government based on free elections and free expression of opinion. We seek honesty and efficiency in all governmental units, as well as in our private lives. We also strive to reach two goals typically and uniquely American: equality of opportunity for *all* the youth of our Nation, and maximum social mobility and fluidity—opportunity for those born into one occupational group to shift to another, without social distinction between groups.

In order to preserve our kind of democracy, we have long realized the importance of an informed electorate. Today, as we battle for people's minds, it is even more important than in the past that we maintain a strong educational system. Colleges and universities are the keystone in such a system. We simply cannot permit them to be crippled, even in a struggle for survival. Education must and will continue; the only valid question concerns its form and size.

One critical type of education which must continue is graduate training for scientists. Gone are the days when 4 years of undergraduate work could pro-

duce a competent scientist. The amazing progress being made in many scientific fields can continue only as we continue to produce adequately trained scientists. In this day of technological war, such training and such progress are truly essential to victory, although we do not put uniforms on our research workers.

Deferment policies must, then, permit qualified students to continue graduate work in essential scientific fields. Such deferment needs to be tied strictly to aptitude on the part of the student and to essentiality of the scientific field.

Many educators will argue against the latter limitation, contending that *all* fields of advanced study are important to our long-range objectives. This argument has much force, and should be sustained in any struggle short of all-out war, but under the conditions being considered here it must be overruled. In a stern struggle for national life itself, popular clamor will demand abolition of *all* deferments for graduate study unless such deferments are tied closely to victory.

Demands for doctors and nurses will be unprecedented, and they must be trained at a rate differing radically from peacetime practice. With millions of civilian casualties, plus heavy military casualties, a new approach must be found to production of medical practitioners. Most civilian casualties will involve burns, wounds caused by flying debris, or radiological injury. Modern industry breaks down production jobs to permit use of semiskilled workmen. So must the medical profession prepare for mass production and utilization of partially trained healers.

Biological warfare may complicate the problem with artificially induced epidemics among men, animals, or crops. These will be concentrated in narrow fields, and must be fought with similar mass production methods.

Another field which received little em-

phasis in past wars will demand attention in the future. As a result of the unprecedented postwar rise in the birth-rate, a tremendous flood of children is now engulfing our schools. Today, for example, the number of students in elementary and secondary schools is 5,600,000 higher than it was only 4 years ago. By 1960, a further 8 million students must be provided with teachers and schools. These prospective students are already born; not even war can stay their advance to school age. Colleges must train increasing numbers of teachers, even in wartime. An aggressive campaign will be needed to persuade students to shift to teacher training. Major emphasis should be placed on women teachers. But this task of providing trained young teachers must not be overlooked.

Adult training, along the general lines of World War II Engineering, Science, and Management War Training Program, is another important task which colleges and universities should prepare to meet.

Throughout the war, many students not involved directly in the war effort must continue their education. Women must be encouraged to continue their studies. Youths below military age must be given the best possible preparation for service to their nation. The need for inspirational teaching, for training which will impart understanding of the problems of modern living and world leadership, and for emphasis on high ideals and high standards, will be even greater than in peacetime. With proper leadership the colleges can and will amply justify their survival in any future crisis.

The Educators Speak

What do educators say about the role their institutions should fill? Probably the best indication of their feelings lies in their resolutions adopted at the October 1950 conference in Washington. Their General Resolutions were briefly referred to earlier in this article.

To appreciate fully the importance of this conference, it is necessary to recreate the atmosphere of the time. The Communists attacked in Korea in June 1950. By that fall, many sincerely advocated full-scale mobilization, feeling that all-out war was almost certain. In early October, Communist forces in Korea were on the run, but still the atmosphere was one of real crisis. Those present had the feeling that war was a strong possibility.

In the absence of contrary information, it can be assumed that these General Resolutions, plus the more detailed resolutions adopted in the 10 Section Meetings, represent the considered stand of those present regarding their role in a major war.

Two points stand out as one peruses the conference report. One is the willingness of colleges and universities to serve to the maximum of their ability. The other is their feeling that they did not have the information they needed to serve ef-

fectively. This lack of information still applies, as far as wartime plans are concerned.

With regard to student deferment policies, the conference expressed a strong feeling that such deferment should not be based on courses or curricula leading to specific professions or vocations, although it did leave a loophole in case such deferment were later judged necessary in the national interest. The conference also expressed a feeling that there is an obligation for deferred students to serve in the Armed Forces or in other work of national importance once their education is completed. If war, unhappily, comes again, many educators can be expected once more to urge against policies limiting student deferment to those taking specific courses.

Everything said or written by our educators, either at this 1950 conference or elsewhere, indicates their sincere desire to serve the Nation in time of war with the total strength of their institutions.

The nature of the world we live in is such that if general war should come again, not a man, woman, or child would be unaffected; more than that, virtually every citizen would be confronted with the responsibility of his own personal care in a desperate effort to survive. This stark reality is being brought home to people as never before by the growing awareness that we are no longer insulated by the oceans and the Arctic wastes. If this great test of national effort should ever come, every military man would be vitally concerned with the affairs of industry and civilian defense; and every nonuniformed contributor would, in some measure, need to have knowledge of military requirements in order that they can intelligently be supplied and fulfilled. Toward the top of the ladder of national effort, where the great decisions must be made, there will be a corresponding requirement for a greater and broader understanding of human affairs. All of these things point to a need for broadening the scope of our national educational system with the difficult concomitant of increasing the amount of actual precise knowledge of an ever-expanding list of subjects. Actually, these are the only principles on which an effective educational structure can be built.

Admiral Robert B. Carney

LABOR MOBILITY IN THE ATOMIC AGE

Colonel O. Z. Tyler, Jr., *Infantry*
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The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

WE TEND to think of American labor as being fairly flexible. Rooted in beliefs in the traditions of our pioneer forebears, who traveled far, and faced great hardships in search of freedom and an honest living, we think this condition persists. Moreover, nurtured on the tales of Horatio Alger, we see our young men, "poor but proud," moving from place to place in search of fame and fortune. Would that this fable were so. We need mobility in our labor force today as never before.

American industry will need a flexible working contingent to meet any mobilization. Faced with the urgent necessity of hitherto unheard of expansion overnight in reaction to atomic attack, our worker group must be readily expansible. In addition, where such attack might easily wipe out one entire segment of an industry, the ability to shift to fill this gap is essential. No thinking person will deny that there is a real danger. Plans must be made to mobilize against this

swift calamity. It is not idly said that rear areas have now become the frontline. We must mobilize and organize industrial manpower on which our national survival depends to meet or counter devastating attack. We must gird for the struggle at home, just as we do on the frontline of battle. Half measures will not do in lightning, total war.

Our experts tell us that our labor is not mobile. Lloyd G. Reynolds—professor of economics at Yale University—cites as conclusions on labor mobility the following principles:

1. Most labor turnover occurs within a small segment of the labor force. Only a minority of the force changes jobs within a given year, and it is a minority of this minority—those who move two or more times during the year—which accounts for most of the movement.
2. Unskilled workers change jobs more frequently than the semiskilled and these in turn move more frequently than skilled workers.
3. The propensity to change employers diminishes rapidly with increasing length of service, 'also with increasing age.'

Gladys Palmer, in a study published recently, verifies this tendency of the working force to remain relatively fixed.

American industry needs a flexible working contingent to meet any mobilization. Faced with the urgent necessity of hitherto unheard of expansion in reaction to atomic attack, our workers must be expansible

The economist, Joseph Shister, states in his *Economics of the Labor Market*:

... a sample study made after World War II in a local market disclosed that only 14 percent of those sampled had changed jobs in something over a year. Furthermore, the voluntary changes are concentrated among a definite sector of the work force, the short service people and young workers.

There appears to be a definite inertia in labor mobility. Although there is substantial evidence that initial job selection is somewhat haphazard, a worker ordinarily hates to move. Shister brings out that even among dissatisfied workers only 20 percent did anything about changing jobs. Whether or not we can thank better administration by an enlightened management for this condition is debatable. It is certain that part of the reluctance to move stems from improved seniority rules and pension plans. Perhaps, the Government's program of making available more and better housing is a measurable factor. In two recent studies improved pay and promotion were overriding factors given by approximately half of those who did change jobs. Moreover, both studies again brought out that the fraction which did change jobs was small.

However, to meet the stress of war the labor force will have to move. Let us look at what happened in World War II. It is estimated that approximately 5,560,000 workers moved in connection with war pro-

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duction during the years 1940-45. The vast number involved will be appreciated when it is realized that only nine states had populations of over 4 million at that time.

Many cities were jammed with migrant workers. Imagine the crowded conditions of San Diego where 27 percent of the population was made up of migrants. Housing, roads, schools, sanitary facilities, and police and fire protection, to name but a few things, were vastly overburdened. Wichita, Kansas, center of a booming aircraft industry, bulged with a mobile work population of 20 percent. These conditions will occur again unless we take drastic steps to forestall them.

However, the problem is not to be licked by physical expansion alone. Plans must include adequate increases in all supporting facilities to include housing, schools, hospitals, and transportation and recreation facilities. Attractiveness will be an important feature of this mobilization project. The necessity for more than routine effort is evident from the following experience of the United States Employment Service in Baltimore in 1942.

It was urgent to get men to take vital jobs in war production work. From 20,000 cases reviewed, 2,734 workers, considered to be best qualified, were interviewed. Of this number, 1,123 of those selected were given the opportunity of the jobs on a voluntary basis. Although a few more accepted the offer, only 26 verified placements resulted from this tremendous effort at the peak of the war period. Something more than volunteering was necessary.

Clarence D. Long, writing in *The Labor Forces in War and Transitions*, states: "The heavy emphasis on defense production called for mass shifts of workers to new industries. In these shifts compulsion played a role not to be ignored."

Whether you believe in universal military training or not it seems obvious that

some form of all-out effort will be required to meet the threat of total war. That this all-out mobilization must include the labor force appears only right and proper, the protestations of representatives of both management and labor notwithstanding. When "the front is everywhere," where is the equity in drafting a man only for military service? When an enemy attack wipes out Gary, Indiana, it will be too late for labor shifts by voluntary methods.

Totalitarian state you cry. Yet, there seems to be nothing incompatible in the suggestion to marshal labor as a national resource just as we do our military forces. Mobilization of the labor force may not be required to the same extent. That will depend on the necessity. It could be done with the same machinery, the local draft board, supplemented by representatives of management, labor, and the United States Employment Service. Here we have in one agency the people most concerned with, and who know most about, the local resources and requirements, civil and military. Local decisions should be made at home by duly constituted local people. This is thoroughly democratic—and realistic.

The program must be realistic. It deals, of course, with that most personal, most basic element—people. If we have to shift them about in their jobs we are impelled

to plan to make it as painless as possible. Knowing that these people are reluctant to leave homes and pleasant familiar communities we must plan to provide pleasant homes, schools, churches, and all the modern seminecessities possible. The majority of these workers will be married—most of the single men will be in the military forces. Therefore, we must plan communitywise.

Moreover, to the greatest extent possible, we will not move our workers at all. In-plant training will be stressed to the maximum. Wherever possible, the job will be brought to the worker.

Finally, we must protect seniority and pension rights for our workers. A man in the working force must have the same equity in his old job as that accorded a member of the Armed Forces. Pension rights might be transferred as the worker moves.

The above constitutes a very sketchy treatment of a tremendously complex problem. But the urgency of the situation is frightening. Everybody talks about manpower but not enough is being done about it. I submit that when the bombs start falling is no time to settle matters by the committee method. We must plan for total manpower mobilization and get the machinery in motion now.

We could never afford to maintain for a long period of time a standing Army sufficiently large to see us through much more than the initial stages of a major war, or even of a so-called "brush fire" war. In any future emergency, the strength of this Nation will, as always, be measured by the quality and number of its civilian soldiers. It is hardly likely we will ever again have the time to mobilize and train a great army from scratch after war breaks out. Therefore, our civilian soldiers will have to be trained, organized, equipped, and ready to go before war comes. This is vital to our security.

Secretary of the Army Robert T. Stevens

JUNIOR OFFICER TRAINING

First Lieutenant Walter A. Coole, Jr., *United States Army Reserve*

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

BECAUSE the lieutenant is the last commissioned rank to interpret and execute policy, he becomes the chain of a commander's influence. In any military force, the potential weakness lies among the inexperienced and untrained.

Several factors increase the need for junior officer training:

1. The present system of duty rotation places a greater stress on adaptability to various duties and conditions.
2. The promotion rate is more rapid than during prewar years, so that an officer has less experience to draw upon than before.
3. Our military force is more complex in its structure.
4. Technological advances require a greater variety of background information for one to be properly oriented.

This increased need is met in the service by several programs aimed at increasing the value of a newly commissioned officer.

Service Schools

The service school represents the major effort toward officer training. It is the most economical way to train officers because it is a centralized activity and permits the officer to devote his attention to the training program instead of dividing it between training and operational duties.

"Associate level" courses provide information and orientation for new officers for a particular career field beyond the basic tactical and technical subject matter of his precommission training. However, such courses are not designed to include every detail encountered in all duties of one particular career field; the information and policies contained in such courses eventually become obsolete and are revised. Thus, the changes ever present in a progressive army and the need for more detailed training make it necessary for a junior officer to receive more training unless he is to learn on the job by trial and error. Mistakes of a junior officer are often costly to the Government, detrimental to morale, and irritating to the commander—not to mention their being embarrassing to the young officer, himself.

Unit Training

Many operational units conduct officers' schools which immediately contribute to the needed proficiency. Their subject matter includes reviews of tactical concepts, changes in administrative and logistical procedures, and matters of local importance—they are often the most convenient means of passing information down to the leaders of subordinate units. Several limitations, however, prevent them from filling in the deficit between the training furnished by the service school and the training needed to perform an officer's duties at the level of efficiency desired by many commanders. In units larger or more complex than a rifle company, the training officer has difficulty in choosing

subject matter of equal value to all officers—the problems of a motor officer are of little interest to the surgeon or the rifle platoon leader. Most operational units have such a diversity of activity that assembling all the officers at one place during duty hours causes a breakdown in concurrent activities; operational units are not able to spend long periods of duty time training their officers. The alternative is a night class; night training is seldom attended with eager interest.

Self-Improvement

The training required for maximum efficiency in the performance of duty is provided, to a large extent, by the service schools and unit officer schools, but the final complement—which is never completed—depends upon an individual's own effort toward his training. The service supports—in varying degrees—a variety of activities from which an officer can construct a program to extend his knowledge of both military and general subject matter to increase his value to the service, and promote his own interests.

To accomplish extensive profits of self-improvement, an officer must utilize his time with care. Exclusive use of off-duty time for study results in lost vitality which comes from inadequate recreation. However, many situations occur during the course of military life other than combat which permit study, for instance: the

Courses. These courses, commonly called "series courses," are offered by every branch of the service—free of charge, even of postal cost—and are valuable to an officer who wishes to prepare for changes in duty assignment and promotion. The study material is uniformly notebook-size; if it is clipped into a notebook, it may be carried around and studied piecemeal, without loss of value or backtracking. Each course is divided into subcourses—pertaining to specific subject matter—such as map reading, personnel administration, tactical intelligence, and vehicle maintenance. If this material is kept by the student, it is often valuable to an officer because it has excellent subject matter organization, and furnishes references, additional material, and diagrams and pictures which can be blown up for training aids when the student is called upon to instruct. The program and curricula offered are described in Department of the Army Pamphlet 20-100, *Announcement of Army Extension Courses*, available in most S3 offices.

USAFI

Widely publicized in military units is the United States Armed Forces Institute (USAFI) Program, which offers correspondence courses at high school and college level. The Program, administered by Troop Information and Education, offers a variety of "broadening" courses at a

Although service schools and unit training schools provide much of the training which is necessary to a young officer, it becomes the duty of the individual officer to complete the process of his own development

delay in a meeting or of a court-martial proceeding, the passive supervision of a class or exercise conducted by a non-commissioned officer, or travel aboard a ship.

The most direct approach to individualized military study is the Army Extension

cost of \$2 for the initial course—succeeding courses are free. The USAFI courses are designed for study in the service and the material furnished is all that is required for reference. This material, like the Army Extension Courses, is capable of being tailored physically, so that it can be

carried around and be worked on at odd moments during the day. Because there is an increasing educational requirement for officers, the USAFI Program becomes more interesting to many career officers since it offers an inexpensive solution to a deficiency in formal education. Often, the subject matter, although seemingly unrelated to military service, can be drawn upon directly for the solution of daily problems of military leadership.

In addition to the USAFI course, the Troop Information and Education Program offers a large number of correspondence courses administered by civilian schools. These courses are more difficult to study during the "blank spaces" in duty hours because they often have a great number of materials, require more concentrated hours, and require more extensive reference materials which are not always immediately available. However, these courses are of great value to individuals who wish to explore the diverse subject matter they offer. Half of the tuition is paid by the Government.

Reading Lists

For a reading program, the Government offers assistance to the individual through several means: reading lists are maintained by various headquarters for guidance, purchase is facilitated through the maintenance of bookstores, and Special

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Services libraries carry a large number of military and general nonfiction books and periodicals. Through reading, an officer can acquire a wide variety of information and opinion that cannot be derived from official sources because of its controversial nature or because of its general nature.

In embarking upon a reading program, one should remember that reading for pleasure depends upon temporary whim, but reading for self-improvement depends upon a planned program. Random reading leads to a lopsided progression in one area or to disconnected, unrelated information that is seldom retained. A pattern should be established so that there is a progression from the simple to the complex, and there is an eventual coverage of wider areas of thought. Authors should be investigated and subject matter should be given critical consideration before it is accepted as authoritative.

Summary

As an officer increases his value to the service, he contributes to his own interest. To any individual who seeks to advance himself in the military service, any training or study represents a means toward a higher level of proficiency and often a wider academic achievement. Service school grades and efforts toward self-improvement affect efficiency reports, which, in turn, affect future promotion.

To the junior officer, training beyond his "associate level" branch training is essential to acquire enough appreciation of the broad picture of the effort of the military service so as to be firmly oriented as he progresses to more complicated and responsible duties. The present system of service schools and unit training provides a large portion of that training, but, finally, the individual officer must complete the process of his own development.

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NOTES ON PACK ARTILLERY

Captain Michael F. Parrino; *United States Army Reserve*

The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

AT THE close of World War I, the services of pack transport and pack artillery began to suffer the lot of the antiquated. The latest vogue in warfare, of course, was the power-driven wheel which, at that time, had already begun to shape military thinking as no one implement of war, with the possible exception of gunpowder, had ever done before. Horses and mules—ignominious participants in man's battles for many centuries—were now doomed to an even greater humiliation than that now given to indifference—namely, the minimization of the very tactical principles that had long been associated with them. The notion of blitzkrieg warfare based on the employment of high geared mobile units—although then only a paper concept—rapidly began to modify such age-old doctrines of warfare known simply in military parlance as accessibility, ease of maneuver, and the ability to sustain continuous operations in the field. The newer concept of mobile war seemingly spawned on broad, flat countrysides, unencumbered by mountains, streams, or jungle and, in many quarters, followed a pattern that was to clothe such terms as double envelopment and pincer movement with an elegance decidedly too

fanciful for a world of natural barriers such as has always existed.

One need search no further than the comparatively late Italian campaigns of World War II to appreciate the fallacy that had long pervaded the character of such military thinking. Needless to say, the mountain ranges and the climatic irregularities of that peninsula did again prove formidable barriers—as they had in Hannibal's time—and the mighty machine began to falter before their vastness.

Italy

So marked was the need then for mules and pack artillery in Italy that General Danford, former Chief of Artillery, succinctly remarked, "The Appenines of Italy just shout for pack artillery." Again the mule was destined to tread the roads and byways as had countless predecessors before him.

It has been supposed in many quarters that had pack artillery been prepared and committed in numbers throughout the mountains of Italy, the campaigns there may have been resolved sooner, although the problem was expeditiously and ultimately resolved through the improvisation of native mule trains for attachment to units of General Mark Clark's Fifth Army.

Hastily recruited pack trains drawn from Italian organizations, and heavily laden with much needed supplies, enabled the 45th and 34th Infantry Divisions, for example, to sustain operations under the most trying conditions of weather and

The ever-present possibility of other "local actions" makes it imperative that we divert more attention to employment of pack transport with its ability to deliver firepower anywhere under any conditions

terrain. Even the 10th Mountain Division, composed mainly of packers and pack artillerymen, played a major role in the defeat of the Germans in that mountainous country, although its impact was not fully felt until a comparatively late date in the war.

The East

In the China-Burma-India Theater, the situation was somewhat different in that it was not so much the need for artillery on mules that demanded our attention, as it was in maintaining long supply lines. Only too recently, Korea indicated the necessity for packers and pack mules trained in the ways of mountain warfare. Certainly it would be no miscalculation to surmise an even further use of pack, elsewhere, under conditions similar to those found in these hapless countries. This is particularly true if one were to consider the possible deterrent effect of the so-called modern weapons of obliteration such as are possessed by the United States and the Soviet Union. For example, Iran offers herself as a most likely country for the use of pack artillery in the event of war there—and, also, the Balkans.

Prior to World War II, the usefulness of pack was seldom questioned. In fact, it was as much a part of our military structure as the Infantry and Cavalry. Captain A. D. Schenck, in 1894, briefly summarized the inquiry as to its role when he said, "At this time, much consideration [must or should] be given to pack artillery as accompanying Cavalry and the Infantry."

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Even at West Point there were mules, for in 1913, a complement of packers and mules were stationed there to provide cadet training, "because when officers went to their posts they were entirely ignorant in packing and managing a pack train."

In World War I, pack was ordained with an even greater respect for its talents. When war broke out there were some 20,000 mules serving in the United States and the Philippines. The number was increased until 29,000 mules were sent overseas as part of our Expeditionary Force. In addition, 29,000 mules from France, England, and Spain were given to the United States Army, making the total serving in France approximately 58,000. Men and mules, it is to be noted, were well trained.

That it was held in high esteem is unquestioned. Consider the attitude of the British, for example, toward its pack service in India, where mountain artillery activities inspired many a glorious page in the annals of British military achievements. It is interesting to note, likewise, that in 1924 mountain artillery was officially recognized as a corps d'elite in the Royal Artillery, and that "it was decided to maintain lists of officers especially recommended for pack artillery, as well as for horse artillery, as both these branches were considered to require officers of more than average ability."

Thus, we see that in those earlier days packing and pack artillery were most certainly worthy components, and that soldiers everywhere regarded them as highly important adjuncts to any army. Typical of such an attitude was the statement appearing in the *Chicago Post* in 1916, "An army without a mule seems as strange as an army without a general."

However, despite all this, the death knell of pack was about to be struck. As long ago as World War I, General Richardson of the Royal Artillery, for instance, "foresaw" the advent of mechanized war-

fare and wrote, "Now it seems to me that to advocate mule transport is in these days retrograde," and, "It is much easier to feed motors with petrol or other motive power, than to feed a line of mules, and probably the original outlay would be much less." Also ascribed to the General was his statement, "And with a single track a strong detachment could take a gun anywhere and bring it into action as

should even replace them, but, rather, on the assumption that many parts of the world still remain inaccessible to the motor-driven wheel.

The Problem

Thus it is that the value of pack transport then lies in its readiness to be employed under the most adverse conditions of terrain. Yet, unlike the machine, its



Above, a mule pack train of mountain field artillery being used to great advantage in transporting supplies and equipment across a stream.—Department of Defense photo.

quickly or, perhaps, quicker than mule guns are now brought."

From that time the service of pack artillery began to deteriorate before the onrushing philosophy of absolute victory through motive power.

The Question

However, we are again reminded of the distinct possibility of the future employment of pack, although not on any basis that it would serve more efficiently than the tank or the full-track, or that it

component parts cannot be turned off an assembly line and quickly put together and placed in the field. Mules are far more complex. Their growth and cultivation require time and patient handling. The fact that our stock in periods of war has come from the farms and the countryside is not to be taken as a problem to be easily solved in the future. True, many of our mules do emigrate from the farm pastures, but this does not necessarily mean that all are acceptable to the rigid specifications required if they are to be of

any lasting use to pack. The necessity for breeding is too well marked for further comment, except to add that the desired product must be of such qualities as to be capable of being trained and hardened for the rigors of campaign.

Planning

In many instances, when the Army has had to employ the mules of other lands, the fact that they differed in size and stature necessitated an even greater appreciation for that prior planning so vital from the standpoint of manufacturing suitable saddles and other equipment, and even of their training for combat.

Needless to say, the planning and preparations must precede many years the purpose for which they are to be employed. With that thought in mind, it would be appropriate at this point to review briefly certain considerations pertinent to pack artillery units and their employment in future wars.

To begin with, the employment of pack artillery as an adjunct to the organic artillery of an infantry division is quite unlike that of its motorized counterpart. Both, of course, serve the same purpose: readiness and ability to deliver firepower when needed—the facility to provide proper support.

Administratively, there is little or no difference. The organizational makeup seeks no appreciable change from a motorized table of organization. The reason is that the organic functions remain essentially the same for each. Some exceptions may be noted, however, such as in combining the functions of the battalion executive officer with those of the operations officer, and the requirement of additional liaison section or sections.

Each battalion has its headquarters battery and firing batteries—the former assuming also the service of supply; battery officers retain the same duty titles as those found in a motorized artillery bat-

tery. Thus, the battery commander, executive officer, reconnaissance officer, and assistant executive are charged with practically the same duties as their counterparts in the motorized artillery. On the other hand, a conspicuous change is noted in the substitution of a stable officer for the motor officer in a motorized unit—the former being another duty of the assistant executive.

It is within the ranks that many changes may be seen. These changes are characteristically in a class by themselves, but are of secondary importance for this treatment in the sense that they do not materially affect the primary functions of the field artilleryman. The mode of transportation necessarily dictates that he be skilled in such additional duties as saddling, packing, and horseshoeing.

Other than these considerations pack and motorized artillery have much in common organizationally and administratively. However, pack differs radically from the modern motorized unit in other ways.

The Fire Direction Center, for instance, demands a higher degree of efficiency and co-ordination than might be attained in the motorized. There must be the utmost of close support with the Infantry. The battalion commander must constantly be with the infantry commander for reconnaissance is most important. In addition, ammunition supply requirements are greater.

The battalion commander has the further problem of conditioning men and animals. Animals, too, must be afforded protection from gas and shellfire and, finally, movement plans must be well prepared in advance and co-ordinated to enable pack artillery units to reach their destination in time, considering that their rates of march differ substantially from those of other units. As noted by Captain A. Mortureux in his book, *Some Remarks on Mountain Artillery*, liaison, command, and supply are most complicated. The battalion

commander is constantly confronted with scarcity of roads of communication, roughness of terrain, and lack of provisions and quarters. As far back as 1922, when his article was written, he suggested that the air arm be utilized toward solving the problem of supply.

This thought is significant at this time because of the increasing importance attached to the latest use of the helicopter. It has been suggested, for instance, that the helicopter might serve as an able replacement for the pack service in that it is able to land anywhere and unload guns—presumably, pack guns—men, and ammunition. The difficulty, however, is that a "helicopter pack battalion," if the expression may be used, would lose its effectiveness at the very outset because it would be unable to maintain sustained operations for which animal pack is noted. Stealth of movement, surprise, maneuverability, and choice of battle positions are inherently the forte of pack artillery. The helicopter may readily enhance the use of pack because of the former's, ostensibly, favoring effect on long supply lines which has always been a subject of military inquiry—particularly in respect to mountain warfare units. Its ability to reconnoiter and its maintenance of closer liaison than heretofore possible are other factors favoring this type of aircraft as a complement to pack. Since modern pack units already possess organic liaison type aircraft, the conversion to helicopters should solve many of the problems peculiar to pack such as observation, communications, and supply. In short, the helicopter would enhance the employment of pack artillery by serving as an integral part thereof rather than its replacement.

Modern weapons such as the 75-mm recoilless rifle also could be utilized, not to replace pack, as a tactical arm, but, merely, to supplement or to improve its firepower and, thus, remain integral parts

within the unit. Battalions containing recoilless rifle teams, however, would be confronted with problems of ammunition supply and organizational equipment for communications, if they were to be capable of sustaining operations in the field.

The point of the matter is that pack artillery is but another means which artillery, in general, plays when armies take the field. It must be able to march, shoot, and communicate. The underlying factor in the use of pack artillery is terrain. The potency of firepower no more changes the nature of the support mission of artillery—including that of pack—than the motive power employed. The growth of artillery as an arm, is, in one sense, the result of the constant search for more effective firepower with the lightest weapon possible—that is, firepower embracing maximum range and destructive power. Atomic warheads, for instance, in the hands of an effective arm such as pack artillery—with its penchant for reaching the inaccessible, coupled with a maximum of maneuverability and surprise, and, its capacity to sustain continuous operations—make it all the more pertinent that we retain and improve this venerable branch of the service.

Long before the advent of the atomic era, Colonel H. L. Scott—when he was Superintendent of the United States Military Academy—stated, "I urge upon all persons in authority that they cherish the pack train and the packer, and see to it that proper trains are always ready in time of need, which time will come at the very beginning of any war on land."

The ever-present possibility of another "local action" like the Korean conflict makes it imperative, then, that we divert more attention to this highly purposeful and noteworthy arm—pack artillery—with its ability to deliver firepower, including the deadliest weapon known to man anywhere and under any conditions.

Smoke Support of River Crossings

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The views expressed in this article are the author's and are not necessarily those of the Department of the Army or the Command and General Staff College.—The Editor.

SMOKE was known to ancient captains of war as an effective means of concealing the activities of a combat force from the eyes of the enemy. It was not until World War II, however, that its use became popular to cover river crossing activities. From the modest use of smoke pots at sites where VI Corps crossed the Volturno River in Italy in October 1943, to the seemingly endless screen of smoke along the Rhine in preparation for Ninth Army crossing in March 1945, the art of this type of support advanced along with development of smoke making equipment.

Throughout the war in Europe, the successful execution of smoke operations in support of river crossings made the construction of heavy bridges possible at an earlier phase of the river crossing operation than would have been possible otherwise, and this speeded the support of armor and heavy artillery and facilitated supply of the forces in the bridgehead.

Actions in Korea added little to the knowledge of how to use smoke in support of major river crossings. True, smoke was used in many places, but, usually for special, small-scale operations such as screening individual artillery positions, narrow defiles, and vital points along lines of communication. Reports of those experiences have contributed materially to development of doctrine for such special operations. They also point out requirements for improvement of equipment and methods of handling and maintaining them.

It was quite evident, however, that some commanders lacked understanding of the potentialities of smoke screening, and many World War II lessons regarding methods of employment and how to plan and control smoke screening operations had to be relearned. Assault of a river line is considered—under current doctrine—a special operation. This implies a requirement for services of highly trained technical specialists. The smoke plan to support a river crossing is prepared by the staff chemical officer who is the specialist in his field. Being in support of a combined arms operation it must be planned concurrently with the over-all plan.

Principles of employment of smoke in support of river crossings are illustrated in the following assumed tactical situation. United States forces are on the offensive moving eastward against Aggressor forces. United States I Corps has been directed to prepare a plan to seize and secure a bridgehead east of the Rhine River, although our forces are being held up approximately 50 miles west of the Rhine. A target date, 30 days hence, has been established as D-day.

It is assumed that I Corps will be screening along the west bank of the Rhine River approximately 5 days prior to the assault crossing, employing the 72d Infantry Division and 201st Armored Cavalry Regiment. The crossing will be made by the 20th and 55th Infantry Divisions in their respective zones. After being passed through, the 72d Infantry Division will assume responsibility for the area north of the zone of the 20th Infantry Division. There will be a show of strength along the entire corps front intended to deceive the enemy as to our exact intentions. The 350th Chemical Smoke Genera-

tor Battalion will have the mission of supporting the crossing and of participating in the corps deception plan. The situation is shown graphically in Figure 1.

The weather forecast for the period is generally fair. Skies probably will be clear throughout the period with visibility of about 10 miles. Early morning ground haze and fog in the valley of the Rhine River usually dissipates about 0900 each morning. Wind is expected to be from the northwest 6 to 10 miles an hour. The average maximum temperature for the period will be 56 degrees; minimum temperature 34 degrees.

A crossing operation is generally considered from three aspects: *intelligence* and *reconnaissance*, *planning*, and *execution*. The smoke requirements must be considered concurrently with all other phases of the operation, and, therefore, may be discussed here in view of the three aspects stated above.

At this early stage, reconnaissance will be limited to aerial and map reconnaissance. Matters of great importance are weather and terrain. At this time, only a general plan for the smoke operation can be stated, but by issuing it early the units that will be executing it will know what to look for in their reconnaissance and have a directive to proceed as soon as our advance forces produce more detailed information gained in the area along the river.

An example of a plan for smoke support of this river crossing is shown in Figure 2.

The control of smoke operations must be retained at the level of the highest command engaged in the operation to ensure that smoke support is used to maximum advantage considering the over-all operation

It should be noted that the form followed here conforms generally with the style of the operation order and annexes recently adopted for United States Army usage. It is anticipated that a smoke plan of this magnitude will be issued to all divisions

of I Corps, support elements—both organic and attached—and to higher and adjacent units.

Paragraph 1, Situation. Provided the basic operation plan accompanies or precedes the smoke annex the essential information regarding both enemy and friendly situations need be stated only once, in the operation plan, and reference made to it in the smoke annex. If available information, not contained elsewhere, is of value to the success of the smoke operation, it should be disseminated through this medium. The situation as it will exist at the time of execution cannot be ascertained at this time. Certain assumptions may be required to localize the planning. In the sample plan the assumption regarding weather is based upon a study of available weather and climate records—in addition to long-range forecasts and local observations. The logistical support situation will be watched closely and whatever actions are required to validate the second assumption will have to be taken.

Paragraph 2, Mission, is a clear, concise statement of the task to be accomplished and its purpose. "Corps establishes smoke screen to support river crossing and corps deception plan, and to provide concealment of crossing sites." This is a statement of the decision made by the commander based upon the advice of his staff and his own judgment.

Paragraph 3, Execution. The first subparagraph states the concept of the opera-

tion. In this operation smoke will be provided by several means. The 72d Infantry Division will make smoke in its own area by use of smoke pots. They should be able to do this with ease since they will not be called upon to prepare

for or make any assault crossings. Actual crossings will be made by the 20th and 55th Infantry Divisions, so it is within their areas that the major smoke effort will be made by the attached smoke generator battalion.

Provision is made for the 701st Infantry Battalion (Heavy Mortar) to support the generator battalion with projected smoke in case the smoke plan is implemented before or coincident with the crossing. If the crossing is commenced in hours of darkness or prior to the lifting of the morning fog, the assault divisions may have advanced beyond the range of mortars on the near bank before the smoke operation is commenced. Corps operation order will provide for relief of the mortar battalion from its smoke support mission, and attachment to divisions after the requirement of the smoke generator battalion has been satisfied. Additional smoke support will be obtainable from corps artillery on call.

To fulfill the requirements stated in the concept, specific instructions for giving smoke support are stated in subsequent subparagraphs of paragraph 3. The lettered areas A through H have been selected previously as possible crossing sites. (See Figure 1.) The enemy will also be familiar with the suitability of these sites and may logically concentrate his force to defend them. It is planned to make smoke demonstrations at as many sites as possible in order to deceive Ag-

gressor as to our selected crossing sites, thereby dividing his force. Since we have decided upon areas D and E for bridge sites, it is desirable to give priority of support to these areas. The instruction to provide smoke "haze" gives some guidance for spacing of smoke installations and for logistical requirements. Detailed planning by the executing units will be required to carry out the plan prescribed in the corps plan.

In this example, smoke missions for all smoke producing units are stated in the corps plan. It follows that tactical control of smoke in the screening operation must be exercised by the highest tactical commander in order to assure a co-ordinated operation. This control can best be effected through the Fire Support Coordination Center.

Paragraph 4, Administration and Logistics, cross references with the appropriate administrative order. In addition, it designates the Army supply points which will support the smoke elements of the operation—with the exception of ammunition which will normally be indicated in the fire support plan and supplied through normal procedures. It is necessary, at this time, to make an allocation of smoke pots to the using units. One of the assumptions was that logistical support will be available to support the mission, but an allocation must be stated to assure the proper distribution of the supplies.

Paragraph 5, Command and Signal, lists only the instructions needed for the smoke operation not appropriate for inclusion in the basic operation plan or other annexes. It is too early to state the locations of command posts for smoke support elements, but it should be made clear that their locations will be supplied when known.

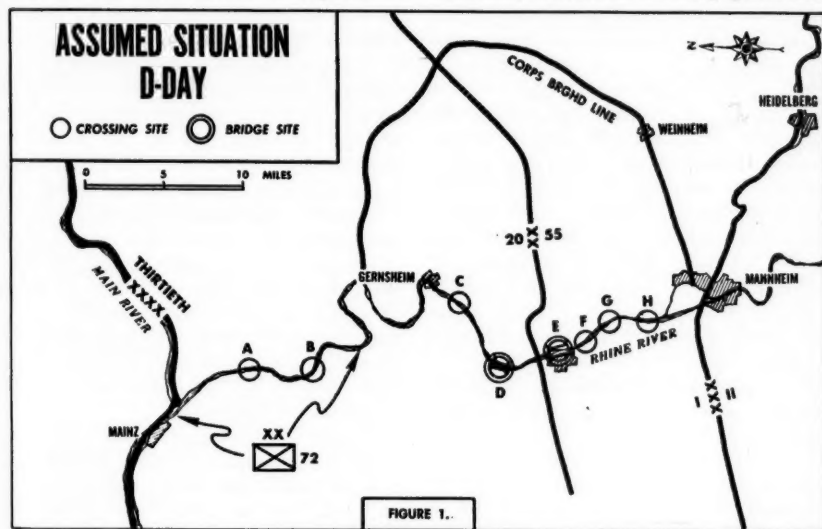
The staff chemical officer, as a technical specialist, will be the principal advisor in the smoke support operation. He will, normally, have been given the re-

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sponsibility of preparing the smoke plan. During the operational—or execution—phase he must work in the Fire Support Co-ordination Center to give guidance in the implementation of this plan. He will watch the progress of the crossing operation and make recommendations as to the advisability of making smoke, continuing smoke, and stopping smoke. In this location, he will have access to reports of

attack to achieve maximum surprise. Therefore, pre-D-day use of smoke to screen preparations and aid in deception is considered undesirable. Inasmuch as the commander has specified that smoke will be used to conceal the assault crossing and bridge sites, smoke operations must commence on D-day.

Based upon prevailing weather conditions there should be an early ground fog



meteorological conditions coming in from the Air Weather Service, Corps Artillery Observation Battalion, and the smoke generator units. He will analyze and recommend the action to be taken on requests for additional large area screening or calls for smoke by artillery. Keeping abreast of the tactical situation, he may recommend changes to the smoke plan and draft orders to effect the approved changes. The corps chemical officer must also maintain surveillance over the availability of smoke munitions and make recommendations for their allocation to ensure the most effective screening.

The corps commander has specified an

and haze until about 0900 on D-day. Considering the time required to build up a smoke haze, the smoke operation should begin about 0830 to ensure there will be no break between the natural fog and the artificial screen. The G3 and chemical officer must give close daily attention to the behavior pattern of this ground fog and haze. If the pattern is so inconsistent that it is felt that no reliance can be placed upon it, smoke operations may be ordered for BMNT (beginning of morning nautical twilight). Conversely, if a heavy fog is forecast to last well into the morning, smoke operations could be withheld during that period.

Once commenced, smoke operations will continue until the bridgehead (0-3 line) is secured. At that time, emphasis will be shifted to provide a smoke blanket over the bridges, and the smoke generator units will be placed under the operational control of the antiaircraft artillery commander responsible for defense of those bridges.

The employment of smoke should not impair seriously the effectiveness of artillery support. Although a preparation will not be fired, fires in support of the attack will be planned. The bulk of the observation required for fire adjustment on targets of opportunity will be accomplished by the forward observers accompanying the assault rifle elements. In the densest portions of the haze—up to 5 miles beyond the river—these observers will have a minimum visibility of about 400 yards, gradually increasing to visibility unrestricted by the haze 8 to 15 miles from the river, depending upon the wind velocity.

Fire adjustment for the 72d Infantry Division—after its displacement to the north—must be accomplished from Army aircraft and ground observation posts on high ground on the near side of the river, inasmuch as this division will not have forward observers across the river. The degree to which the behavior of the smoke will interfere with the observers on the high ground to the west will depend upon the wind and temperature gradient. Smoke tends to cling to ground when temperature decreases with elevation; and to lie between these two extremes when temperature remains constant with elevation.

Air attack of targets located within the dense portion of the smoke haze will be limited by the ability of the forward air controller to see the target and pinpoint its location to the attacking aircraft, and by troop safety restrictions announced by the commander. Once the target has been located by the strike air-

craft they should experience little difficulty in making their attack. Under normal conditions, the density of the haze will permit suitable observation from directly above, and it is unlikely that smoke will rise to a height which would interfere with control of aircraft.

The control of strikes against point targets by target director posts is considered unsafe in light of the probable error, and the close-in location of the target to friendly troops.

The operation plan of the smoke generator battalion will provide for displacement across the river of the necessary generators. The displacement can be accomplished as soon as the assault troops have reached the range of enemy direct fire (0-1 line)—providing all generators are not required to maintain the haze. Should all generators be in operation on the near bank at the time of a shift of wind direction, they would be moved rapidly across the river under cover of smoke projected by artillery and mortars, and from smoke pots ignited by the advancing assault troops on the far bank.

Because smoke movement is subject to weather and terrain conditions, and may rise or drift into areas which are the responsibilities of other commanders, the tactical control of large area smoke operations must rest with the commander of the highest level participating in the operation. In this situation, this is the commander of I Corps. However, such control of large area smoke operations does not preclude the use of local smoke by a subordinate unit to blind enemy observation, protect an exposed flank, cover the extrication of a trapped unit, or for similar purposes.

In addition to the co-ordination of the smoke operation that is necessary within the corps, the smoke plan must also be co-ordinated with air defense and with adjacent units—particularly II Corps. The predicted direction of the wind will re-

(Classification)

COPY No 5
I Corps
OBERSTEIN ()
27 Sep

Annex D (Smoke) to Opn Plan 17
Map: GERMANY, 1:100,000, FRANKFURT-MANNHEIM

1. SITUATION

- a. Enemy forces. Annex A (Intel) to Opn Plan 17.
- b. Friendly forces. Annex B (Opn Overlay) to Opn Plan 17.
- c. Attachments and detachments. (See Opn Plan 17.)
- d. Assumptions.
 - (1) That normal weather will prevail in area during period of smoke operation.
 - (2) That sufficient logistical support will be available to support the smoke operation.

2. MISSION

Corps establishes smoke screen to support river crossing and corps deception plan, and to provide concealment of crossing sites.

3. EXECUTION

- a. Concept of Operation. 72d Inf Div will screen area North of 20th Inf Div crossing site with continuous smoke haze utilizing smoke pots, and projected smoke munitions, to support the corps deceptive maneuver. 350th Cml Smoke Genr Bn will screen approaches to crossing sites, the crossing by assault units, and bridging operations in the 20th Inf Div and 55th Inf Div zones, and support corps deception maneuver with feints and demonstration. Projected smoke munitions in direct support of the 350th Cml Smoke Genr Bn, will be provided by 701st Inf Bn as required. Additional fire missions obtainable on call from corps artillery.
- b. 72d Inf Div
 - Atch 201st Armd Cav
 - (1) Provide smoke haze over areas A and B by use of smoke pots and organic fire.
 - (2) Provide continuing support until 0-3 line secured or on order.
- c. 350th Cml Smoke Genr Bn
 - Atch 361st Cml Smoke Genr Co
 - 362d Cml Smoke Genr Co
 - 363d Cml Smoke Genr Co
 - 364th Cml Smoke Genr Co
 - (1) Provide smoke haze over areas C, D, E, F, G, H.

Appendix 1—Smoke Overlay

Distribution: A

First Army
II Corps
Ninth TAF(FTR)

OFFICIAL:
[s/ Butcher
BUTCHER
G3

- (2) Priority of support to areas D and E.
- (3) Provide continuing support until 0-3 line is secured.
- (4) Provide haze over bridging operations in areas D and E on order.
- (5) Co-ordinate with assault Div relative to position areas and use of crossing means.
- d. 701st Inf Bn (Hv Mort): Support pre-H-hour smoke operations of 350th Cml Smoke Genr Bn.
- e. Corps Arty
 - (1) 603d FA Gp: 628th FA Bn (155-mm How, towed) and 629th FA Bn (155-mm How, towed) provide smoke support on call beginning H-hour.
 - (2) 609th FA Gp: 646th FA Bn (Hv, SP) (155-mm Gun) provide smoke support on call beginning H-hour.
- f. Appendix 1. Smoke Overlay.
- g. Co-ordinating instructions.
 - (1) Control of smoke this headquarters.
 - (2) Smoke mission co-ordinated through FSCC.
 - (3) Be prepared to sustain continuous smoke operations during daylight hours D minus 1 through D plus 1.
 - (4) Request for air delivery of smoke through FSCC.

4. ADMINISTRATION AND LOGISTICS

- a. AdminO—
- b. Fog oil CI III Sup Pt 674 ALZEY (2727).
- c. Smoke Pots.
 - (1) ASP 934 MARNHEIM (2214).
 - (2) Allocation.

Unit	M4A2	M5
20th Inf Div	50	100
55th Inf Div	50	100
72d Inf Div	600	10,000
350th Cml Smoke Genr Bn	400	600
All Others	Basic Load	

- d. WP and HC shell. See Annex C (Fire Spt Plan) to Opn Plan 17.

5. COMMAND AND SIGNAL

- a. Normal radio traffic all areas.
- b. Command.
 - (1) CP 350th Cml Smoke Genr Bn ———.
 - (2) CP 701st Inf Bn (Hv Mort) ———.
 - (3) FSCC ———.

Acknowledge.

JONES
Lt Gen

(Classification)

FIGURE 2.

sult in the haze covering a portion of II Corps area. The II Corps must know that I Corps will be using smoke so that it may make plans to take advantage of the smoke; revise their plans if the smoke will interfere; and know that the smoke is from friendly sources and with whom to communicate for adjustment of the smoke density.

Another item for consideration is the possible use of smoke for protection against thermal effects of an Aggressor atomic attack. The great assemblage of personnel and equipment at the crossing sites just prior to an assault crossing would be a lucrative target for an atomic attack. If such an attack appeared to be imminent or if tactical surprise had been lost in the face of a known enemy atomic capability, a large area smoke screen to protect friendly troops from the heat effects might well be justified. In anticipation of this type smoke screening operation, appropriate instructions should be included in the smoke annex.

Smoke may be used effectively to support assault river crossing operations. Depending upon the tactical situation it may be used to conceal preparations for the river crossing, to assist in the deception plan, and to afford protection at the site of the actual crossing. The means for smoke screening should be established on the far shore early—not only to assist in concealing crossing activities, but also to cover the advancing troops until the bridgehead is secure.

The primary means of producing smoke over large areas is the mechanical smoke generator. In addition, smoke pots are very effective for area screening, and have special advantages such as quietness of operation. Their small bulk permits them to be set up quickly for filling gaps in screens, protection of primary generator sites, and ease of supply and transportation. Smoke may also be delivered by aircraft, artillery, and mortar shell.

If practicable, smoke generators should

be in position before the need for screening develops. To meet this requirement, the smoke plan should be developed concurrently with the over-all tactical plan and issued as early as possible. Based upon their knowledge of the supported units' mission, the smoke plan, and personal reconnaissance and detailed analysis of weather and terrain, the commanders of smoke units must prepare detailed plans for furnishing the required smoke support.

The smoke plan is normally prepared by the staff chemical officer of the headquarters in charge of the over-all crossing operation. It is published as part of, or annex to, the crossing plan. During the planning and the operational phases, the chemical officer, or his representative, will function as a member of the Fire Support Co-ordination Center.

The area covered by smoke must exceed that actually required for the preparation and assault. Too small an area permits the enemy to mass artillery fires, air effort, and atomic attack on likely areas near crossing sites. The area covered by smoke must include several crossing sites, plausible assembly areas, and suitable access roads. A large area serves to confuse the enemy as to the intended site of the crossing, permits a maximum amount of dispersion to reduce the effects of enemy fires, and affords some protection against flash burns and incidental fires from atomic attacks.

The employment of smoke will restrict the ability of ground observers to adjust artillery fires and air strikes on targets of opportunity located within the smoke haze. The presence of smoke may also cause local interference with bridging operations, reconnaissance, and movement of vehicles. Consequently, the control of smoke operations must be retained at the level of the highest command engaged in the operation to ensure that the smoke support is used to maximum advantage considering the over-all operation.

MILITARY NOTES

AROUND THE WORLD

UNITED STATES

Drone Control

An improved ultra-high frequency radio system providing for continuous control now guides remote controlled jet planes. A miniature electronic "brain" takes over within 5 seconds, if radio control signals shut off while the drone is in flight, directing the plane to a preset altitude where it circles until signals are restored. The new system can be applied to piston as well as jet aircraft and operates both ground-to-air and air-to-ground.—News release.

Inventory 'Clerk'

A mammoth electronic "brain" is being installed at the Detroit tank-automotive center by the Army to replace 350 clerks who keep an inventory of the replacement parts needed to keep all United States military vehicles rolling. It was explained that the machine can do in minutes what it required the clerks a month to accomplish. When it sees stocks falling on any of 450,000 items, the machine will flash a warning to buy more. According to the announcement, it will be the Army's first electronic "brain" and is known as *Bizmac*. When data is fed into the machine, it types out its answers in triplicate.—News release.

Global Command Network

Designed to ease the command pressure on the naval communications center at Washington, the Navy recently opened its 15.5 million dollar command communications system. The new network, which is global in scope, will serve as the hub of communications for the Atlantic Fleet and for the North Atlantic Treaty Organization commands. The system has three major centers. The receiving unit is located near Norfolk, Virginia; the transmitter facility is near Suffolk, Virginia; and the control center is located at the Norfolk Naval Base.—News release.

Rotation Plan Set

Under Operation *Gyroscope*, seven posts have been designated as the permanent home stations for 16 divisions involved in the new unit rotation program. The permanent home stations announced by the Army are Fort Riley, Kansas; Fort Lewis, Washington; Fort Ord, California; Fort Hood, Texas; Fort Campbell, Kentucky; Fort Benning, Georgia; and Fort Bragg, North Carolina. Except in the case of the 1st and 10th Infantry Divisions at Fort Riley, the Army did not identify the divisions that will call the various posts home.—News release.

Flying Platform

A small wingless "flying platform," which has made short successful flights carrying a pilot, has been developed under the auspices of the Office of Naval Research. The small circular device, on which the pilot stands, uses a new prin-



Wingless flying platform tested for Navy.

ciple of lift and propulsion called the ducted fan. Two propellers rotating in opposite directions suck air through holes in the platform and supply a downward thrust which provides the vertical lift. Inclosed in a circular casing which protects the pilot from the blades, the propellers are powered by separate engines which together develop less than 100 horsepower. The flights indicate that this principle has possible applications in larger vertical flight aircraft. The machine, which combines the principle of control by "weight shifting" with the "ducted fan," definitely establishes the feasibility of radically simplified flight. Directional flight is achieved by leaning in the direction one wishes to go. Further research and development will be necessary before these principles can be applied in the production of military aircraft it was pointed out.—News release.

'Aerobee-Hi' Rocket

To obtain information on the atmosphere at altitudes up to 135 miles, the Air Research and Development Command has developed the *Aerobee-Hi Rocket*. The rocket is expected to obtain data on solar radiation, sky brightness, and other important natural phenomena encountered at altitudes well above 100 miles. It is powered by a 4,000-pound thrust motor. The rocket is fired from a launch tower. It is manufactured of lighter, stronger metals than previously used and is nearly 30 feet long.—News release.

Boundary Layer Control

Details of two practical systems of boundary layer control which will reduce aircraft takeoffs and landing speeds by one-third and lengths of runways required by one-half were disclosed by the Air Research and Development Command. The boundary layer is the name applied to the thin layer of air found next to the surface of aircraft wings in flight. As the wings move through the air, this thin layer drags along the wing surface and causes the air stream to separate from the wings at certain points, particularly at the wing flaps or at the sharp leading edges of thin wings. As the lifting power of a wing is dependent on a continuous, uninterrupted flow of the air stream over its surface, the separation of the stream caused by the dragging boundary layer considerably reduces lift. The first method employs a suction system which was used at the leading edge of an *F-86F* plane. The second method was designed for a wing flap combination and a *C-123* transport airplane was used. In this system, both suction and blowing are used to remove or otherwise nullify the effect of the boundary layer. The Germans had proposed the use of this system on one of their heavy transport aircraft during World War II, although they planned to use rockets in the wings.—News release.

Super Constellation

A new turboprop *Super Constellation* designated the *YC-121F*, made its maiden flight recently. Powered by four 5,700 horsepower turboprop engines, the 440-mile-an-hour plane has a normal cruising altitude of 20,000 feet, and a take-off weight of 75 tons. It can fly 106 passengers, 18 tons of cargo, or 73 litter patients. The plane has a rate of climb of 2,240 feet a minute with full load.—News release.

Single Shoe Style

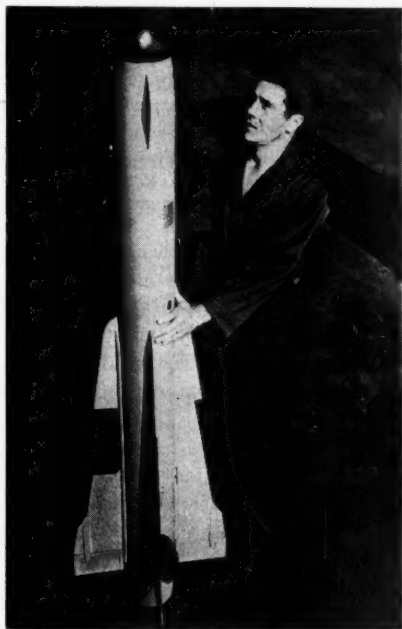
As the culmination of several years' research, study, and experimentation in efforts to improve the shoe design, reduce the number of sizes, and develop items of footwear suitable and acceptable to all the services, the Armed Forces have adopted a single design of men's low-quarter dress shoes. The standardized shoes will be purchased for issue after present stocks of shoes and lasts are exhausted. The new lasts on which the shoes will be made, developed by the Army Quartermaster Corps in co-operation with the other services, will reduce the number of sizes now carried in the Army's supply system from 235 to 113 as well as comparable reductions in the other services. The reduction is accomplished by eliminating alternate widths now employed. Reduction of stocked sizes by over one-half will simplify storage and issue procedures and result in substantial savings.—News release.

Microscopic Germ Counter

An instrument known as the aerosoloscope has been developed by the Army Chemical School to give instant warning of an enemy germ warfare attack. The device measures and counts microscopic airborne germs, dust, and moisture particles, one at a time, at the rate of 100 per second. It will also count radioactive particles and determine their size.—News release.

Smallest Guided Missile

Carrying its own powerplant which drives it at supersonic speeds, the United States Air Force's *Falcon*, a guided aircraft rocket, is described as the smallest guided missile in production. The *Falcon's* own guidance system can direct it to a maneuvering target, and the at-



Smallest guided missile packs big punch.

tached warhead is capable of destroying a bomber. According to information received, it will be carried in quantity by Air Force interceptor aircraft. The interceptors are guided to the proper firing position by electronic control systems which lock on an enemy bomber by radar and fire the *Falcon* missiles automatically. During tests the missile has knocked down maneuvering *QB-17* and *QF-80* jet aircraft even when no explosive warhead was attached.—News release.

Camouflage Scheme

As the result of experiments, all Navy and Marine Corps combat planes are to receive a new paint scheme which has proved to be better camouflage than the familiar dark blue now used. Navy carrier and Marine combat planes will be painted glossy white on the lower wing and fuselage surfaces and light "gull" gray on the upper wing, fuselage, and horizontal tail surfaces. The upper portion of the wing control surfaces also will be white. Helicopters will be painted light gray, while patrol aircraft, both land-based and seaplanes, will be painted a semigloss "seaplane" gray color. In addition to the new scheme for combat planes, jet trainers, other than primary, and reciprocating multiengine trainers will be painted a split orange and white color scheme. All primary trainers will retain the present over-all orange-yellow color.—News release.

Automatic Ejection Seat

A new, totally automatic ejection seat, which operates in the shortest possible time and from the lowest possible altitudes, is now being used in the vertical takeoff fighter planes. Under the new system as the ejection seat is fired from the plane, the safety belt is opened. Strong nylon cords then halt the seat for a fraction of a second when it is 6 feet out of the cockpit. The parachute is then opened and inflated, and the pilot is free both from the airplane and the seat.—News release.

Study Move

The possibility of moving Fifth Army Headquarters from its present location in Chicago to either Fort Des Moines, Iowa, Omaha, Nebraska, or Jefferson Barracks, Missouri, is under study. A survey is being conducted to determine what problems would be involved in the proposed transfer.—News release.

Wing Flap Plane

Tests are being conducted on a new type of experimental wing flap that would allow vertical takeoff for conventional looking planes. The plan involves fast moving, triple-blade propellers with a somewhat larger than usual diameter which are mounted on the wings in conventional position. The lift is achieved by these propellers thrusting back high velocity winds that are deflected downward by movable wing flaps. To achieve normal flight once the plane is in the air, the flaps could be set in horizontal position, although this has not as yet been tested.—News release.

'Arctic Subways'

The possibility of tunnels under the ice and snow to facilitate the movement of materials, equipment, and troops will be studied during the Army Engineers' Arctic Task Force expedition to the Greenland icecap. The subsurface tunnel plan has been tentatively proposed as a means of avoiding serious problems of weather, navigation, and trailmarking in travel about the 700,000-square mile icecap. The Task Force has the mission of studying Arctic conditions as they relate to the movement of troops and supply of facilities, and developing new techniques. A trench 25 feet deep and 12 feet wide will be cut into the snow with special snow-plowing equipment. The trench will then be covered over with snow blocks in a fashion similar to building subways. Other projects of the Task Force include studies of ice ramps, crevasses, and ice cliffs as they influence access onto the icecap; problems of navigation and route finding systems; the building of experimental roads and airfields on and of snow; the building of subsurface structures such as storage areas, warehouses, garages, and hangars with a minimum of imported materials; and a study of water and power sources.—News release.

High-Flying Rocket

An aluminum ball, carrying rugged instruments to collect upper atmospheric data and radio the information to the ground as it falls, will be carried 75 miles into the air by an 8-foot, needle-nose rocket. The 220-pound rocket will drop the ball when it reaches its prescribed height. Booster units will carry the rockets to high altitudes and then it will continue under its own power. When it reaches the high point in its flight, the rocket's hull will burst open to release the ball.—News release.

Medical Insignia

To identify Air Force Medical Service physicians and dentists more readily, a new medical insignia design has been approved for use in the near future. Flight surgeons will continue to wear their wing insignia. The insignia is a small silver badge with a caduceus, or serpent, entwined on a staff and mounted in its center. The dental badge is identical to the one to be worn by physicians except for a "D" superimposed on the caduceus. The badge will be worn above the left breast pocket.—News release.

Nuclear Propulsion

Under two projects announced recently by the Atomic Energy Commission and the Department of Defense, nuclear propulsion for large naval vessels will be developed. Under one project, research and development work on a reactor suitable for large ship propulsion is to be accomplished, while under the other separate design studies of large nuclear powered ships will be undertaken.—MSTS.

Convert Sea Water

Conversion of sea water to fresh water at reasonable cost appears as a promising prospect on the basis of tests now being conducted. It would serve as a source for the world's fresh water needs in the event of a shortage.—News release.

Airlift Units

The first combat units of Operation *Gyroscope* to be moved tactically by the Air Force between an oversea station and the United States will be the 187th Airborne Regimental Combat Team from Japan and the 508th Airborne Regimental Combat Team now stationed at Fort Campbell, Kentucky. The 187th will return to Fort Bragg while the 508th will replace it in Japan. The rotation movement will be supported by *C-124 Globemaster* troop carriers in the 12,000-mile round trip airlift over the Pacific. The plan to airlift the units is designed to test the effectiveness of procedures governing the tactical air movement of combat units to and from overseas stations and it will be evaluated for future moves.—News release.

Supersonic Interceptor

Assigned the task of stopping enemy bombers before they reach American tar-



F-102A mans the country's outer defenses.

gets, the *F-102A* all-weather supersonic jet interceptor is undergoing test flights. The plane differs from its prototypes in a longer fuselage, streamlined fairings at the aftend, upswept wingtips, and a canopy redesigned for greater pilot visibility. A *J-57* jet engine with afterburner powers this day or night continental defense weapon.—News release.

EGYPT

Troops Depart

The last British troops have left the Suez area and the remaining British installations there have been taken over by Egyptian authorities. The action is part of a 20-month plan for the evacuation of British forces from the entire Suez Canal Zone under the terms of the Anglo-Egyptian agreement reached last October.—News release.

News Agency

The formation of the first big Egyptian news agency, a private concern subsidized by the government, was announced recently. It will be staffed by Egyptians, with offices in most capitals of the world and correspondents in other places. The agency will have a photographic section. A 2-way service, sending Egyptian news to the outside world and providing world news coverage for Egypt, will be provided by the agency.—News release.

INDIA

'Citizen Army'

Designed to train a "citizen army" of half a million men within 5 years, 34 military training camps have been opened all over India. It is hoped to train 100,000 volunteers annually. The camps will give basic military training to groups of volunteers between the ages of 18 and 40 for a period of 1 month. It was explained that the training of the new National Volunteer Force was not so much for the defense of the country as to inculcate a feeling of discipline and self-reliance among the people.—News release.

Record Budget

The country's first billion-dollar budget, with about 4 rupees in every 10 going to the military, was released recently. During the coming fiscal year 424 million dollars will be spent on defense, much of it for increased pensions.—News release.

THE NETHERLANDS

Weather Forecasting

The biggest movable radiotelescope in the world, now under construction at Dwingelo, may lead to improved weather forecasting. Its bowl, made from fine wire mesh and designed to catch ultra-short-wave emissions, will be 81 feet across and mounted on pivots and a turntable so that it can be tilted and trained at will. Until the development of radar, no means was known for detecting electromagnetic waves given out by interstellar matter. Radar research opened a new field for astronomy and showed that it was possible to pick up hydrogen radiations on a wave length of about 21 centimeters. As hydrogen is the most common element in the universe, astronomers are paying particular attention to this wave length. The new radiotelescope is designed for the decimeter waves ranging from 10 centimeters to 1 meter. Useful data on weather conditions in the upper stratosphere, closely affecting the earth's climate, is also provided.—News release.

SWEDEN

Robot Weapons

As the result of intense research by the Robot Weapons Bureau for the past 6 years, the country will be well equipped with this type of armament soon. Present plans call for a cut in the Army and Navy strength, while the Air Force will be increased. All three branches of the military will be equipped with robot weapons, permitting the cut in personnel.—News release.

JAPAN

Transfer Minesweepers

Three minesweepers have been transferred to the Japanese Government by the United States Navy it was announced recently. The transfer completed the allotment of seven such vessels promised in the Mutual Defense Assistance Pact between the two nations.—News release.

GREAT BRITAIN

Test 'Hosepipe'

The *Cumberland*, the cruiser being used for "atomic age" trials by Great Britain, will test new equipment designed to fight off jet planes and counter radioactive fallout. The main item to be tested is a new, fully automatic antiaircraft gun known as the *Hosepipe*. It automatically pumps 3-inch shells at attacking jet planes, once they are picked up on radar, at a rate comparable to that of a machine-gun. An automatic system for washing down the ship's upper structure during and after fallout from atomic explosions while the crew remain under cover and continue to control their weapons and ship from between decks is to receive additional trials. Other items to be tested include a 25-foot motor cutter made of fiberglass, fin stabilizers, survival suits, control instruments for pilotless target planes, and an experimental distilling plant.—News release.

Salt Water Spray

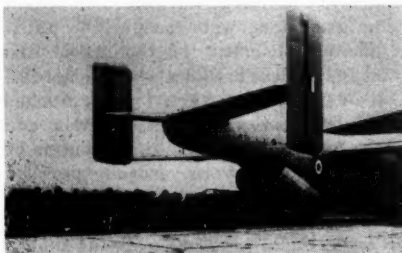
In order to protect its ships against contamination by radioactive particles, the Admiralty has ordered all new warships to be fitted with nozzles distributed about the ship through which salt water in great amounts can be sprayed over all-weather surfaces. It is felt that salt water, sprayed with an intensity exceeding that of a tropical rainstorm, is one effective method of accomplishing this protection. As the result of an experiment, the Admiralty feels that fission matter is less likely to adhere to a surface while it is being subjected to a systematic salt water washdown, and such as does adhere can more speedily be removed from the infected parts. The system is considered particularly suitable for the Navy's new, fast antisubmarine frigates on which working spaces are entirely inclosed—even the lookout positions being under plastic domes.—News release.

Rocket Motor

A liquid-propellant rocket motor, the *Spectre*, specifically designed for high-performance fighter planes is ready for testing. Combined with a normal jet engine, the *Spectre* will give a fighter very rapid takeoff power and the ability to maintain an outstanding rate of climb to extreme altitudes.—News release.

Largest Transport

The first production model of the 100-foot-long *Beverley*, Great Britain's largest air transport to date, recently completed its maiden flight. It is the first



Troops board Britain's largest transport.

British aircraft designed principally for dropping heavy military equipment by parachute. The plane also can be used as a troop carrier or air ambulance. Despite its size, the *Beverley* can operate from 1,000-yard runways and can "float down" to land in almost helicopter-like manner. The transport is powered by four *Centaurus* engines. It has a normal range of 1,600 miles with a maximum speed of 238 miles an hour.—News release.

Midget Submarine

Realizing the value of the midget submarine, the British have developed the *X51* to replace those of the *XE* class used during the last war. The speed was not revealed but the craft is said to be fast and maneuverable.—News release.

SOUTH KOREA

Graduating Class

Modeled as closely after the United States Military Academy as the national conditions, customs, and characteristics of the people permit, the Korean Military Academy, located at Muk-Tong, graduates its first class of 160 cadets soon. The Academy had its beginning in 1945 in a school known as the Military English Language School. It was redesignated the Korean Military Academy in 1948 on the third anniversary of the liberation of Korea. The school was blasted into rubble in the summer of 1950 and it was not until 1952 that a new class was enrolled in the academy. Military advisors, all West Point graduates, were assigned to assist in the establishment of the school and West Point ideas and ideals were embodied in the new academy. The 4-year academic curriculum, the military instruction and tactical training, and the daily routine of the two academies are generally parallel. The course of instruction is designed to give a liberal education, with accent on the natural sciences, and a broad understanding of the entire military establishment. Specialization has been avoided. The famed West Point honor system has been adopted and applied at the Korean Academy.—News release.

SOUTH AFRICA

Study Purchase

To strengthen the Union's air defenses, the South African Air Force is considering buying *Gnat* lightweight jet fighters. Serious consideration is said to be given to the plan to establish an assembly plant in the Union, an indication that a large number of the planes is to be purchased. For the cost of six standard fighters, 20 lightweights can be produced and fitted with all essential flying, navigational, and armament equipment. The light fighters are highly maneuverable and easy to fly and service.—News release.

AUSTRALIA

Pay Raise

Pay raises for commissioned officers of the armed services, ranging from about \$3.46 a week for second lieutenants to \$25.87 a week for brigadiers, were announced recently.—News release.

Revise Training

To meet requirements imposed by new methods of warfare and the possible use of atomic and thermonuclear weapons, the Army has revised its system of training, with provisions for the introduction of new methods and modern equipment in all sections. The new doctrine is to be adopted immediately, and will be adjusted from time to time as demanded by developments in new types of warfare. The modifications to present teachings in tactics and operational procedures considered necessary to cope with the new conditions have been drawn up and are being issued in a training pamphlet by Army Headquarters. During the current year, 23 Army schools of instruction are to be held, and it is estimated that more than 10,000 students will attend for instruction in 400 courses. Command training activities are to be increased, also. In addition to the training for atomic warfare, additional facilities are being provided for training in jungle and tropical operations and two Commando units are being raised for training in guerrilla warfare. Plans are being made for a cadre of trained pilots among Army officers and noncommissioned officers.—News release.

New Rifle

The new *FN 30* rifle, a Belgian weapon which is to be made in Australia, will replace the *Lee Enfield 303* rifle as standard equipment in the Army. The new rifle has been accepted as a standard weapon by North Atlantic Treaty Organization members. It has been designed to have a minimum of recoil.—News release.

NORWAY

Deliver Minesweepers

Under the United States Offshore Procurement Program two of five minesweepers were delivered to the Norwegian Navy by Norwegian boatyards recently. All five are of the AMS class with a displacement of 270 tons. Their minimum speed is 15 knots and the over-all length is 136 feet. Previously, two United States minesweepers were made available to the Norwegian Navy under the United States Mutual Defense Assistance Program.—News release.

Atomic-Powered Ship

Under a 5-year research program on atomic ship propulsion proposed by *Jen-ner*, an international atomic research project, it was reported that if the plan is approved by the Norwegian Government, the first experimental ship reactor could be ready in 2 or 2½ years. The work would be undertaken by Norway and the Netherlands at their joint atomic research laboratory at Kjeller, near Oslo according to the announcement.—News release.

TURKEY

Middle Eastern Defense

Visible progress toward the establishment of the kind of solid Middle Eastern defensive system that has often been attempted without success in the past was seen in the recent defensive pact signed between Turkey and Iraq. The new link in collective defensive strength against possible aggression provides for co-operation to safeguard the security and defend the territorial integrity of the signatory countries. It is for 5 years and renewable for 5-year periods. It is open for adherence by any Arab or other state which is interested in the peace and security of the region and recognized by the contracting parties. Turkey is a member of NATO and already has separate alliance with each of the following countries: Greece, Yugoslavia, and Pakistan.—News release.

FRANCE

Rear Jets

By placing the jet engines in the rear part of the fuselage of the twin jet, medium transport *SE.210 Caravelle*, the designers were able to achieve an exceptionally clean wing which also contains the fuel tanks. Because of this, the control surfaces are not affected by any neutral zone generally associated with the engine cowlings. An additional safety factor has been achieved by placing the fuel tanks far from the powerplants. The position of the engines allows for a lower level of cabin noise than usually found in other aircraft.—News release.

'Super Mystere'

Official trials have begun for the *Mystere IV B.1*, called the "Super Mystere," a plane which has passed the sound barrier in a shallow dive and in level flight without any modifications. The supersonic



Supersonic interceptor ready for trials.

interceptor is powered by a *RA.7* jet engine with afterburner. The wings and tail surfaces of the aircraft have a considerable degree of sweepback. The plane is equipped with an all-flying tail of the slab type and the cockpit has been completely redesigned to offer better visibility. The air intake has a flat oval shape. Supersonic speeds were reached at an altitude of about 52,500 feet according to the announcement.—News release.

USSR

Rail Extension

The Murmansk railroad, the Soviet's Arctic lifeline which served as the main route for delivery of American Lend-Lease supplies during World War II, has reportedly been extended northwest about 100 miles, almost to the Norwegian frontier. It was said that the strategic extension of the railroad, consisting of a single line, was now completed. Every effort has been made by the Soviets to keep the existence of the track secret. It is reported that the Soviets are currently transporting military supplies to their numerous airfields and troop concentration centers near the Arctic coast over this line. The line terminates at Liinahamari, the chief harbor of Petsamo, and a naval base. The existence of the base is said to be a new development. Airfields are located at Loustrai and Polarnoje. The railroad is also used to transport ore from the nickel mines at Petsamo and in conjunction with power building projects in the area.—News release.

Huge Cannon

The Soviets recently displayed four huge, secret cannon which appeared more elaborate and technical than necessary for conventional artillery, and included a curious looking recoil system. It was felt by observers that they might be able to fire atomic shells of somewhat less than 6-inch caliber.—News release.

New Loan

For the development of the national economy, the Soviet Council of Ministers announced a 20-year loan of about 7,857 million dollars. It was announced that the loan would run from November of this year to November 1975 and that the bonds would be tax free. The last Soviet state loan for this purpose was launched in June 1954, but it was only for half the amount of the new loan.—News release.

Ease Curbs

As Austria waits for the approval by the parliaments of the United States, Great Britain, France, and the Soviet Union of the peace treaty which makes her a sovereign, independent, and democratic nation again, the Soviet Union has announced that she is easing the burden of occupation in that country. The Soviets agreed to hand over to Austrian authorities the right to permit French and West German shipping on the Austrian reaches of the Danube; to place no hindrance in the way of entry without visas into Soviet-occupied eastern Austria by citizens of states with which Austria has concluded agreements for the abolition of entry and exit visas; and to cease to examine consignments of goods at the demarcation line dividing the Soviet zone from Western Austria. Under the agreement, the Soviets stated that when the treaty is signed all her occupation troops will be withdrawn; all Austrian prisoners held in the Soviet Union will be returned; Soviet-held shipyards and oil refineries will be returned; and that Austria could pay her war debts to Moscow in goods instead of cash. Within 90 days after the peace treaty is signed by the countries concerned, all foreign troops will leave Austria and she will become a neutral country similar to her neighbor Switzerland.—News release.

Develop Weapons

Soviet development of guided missile and jet artillery has been announced by the Army newspaper *Red Star*, which is the same paper that told the Russian people of the atom bomb. The guided missile is claimed to be the equivalent of the United States *Nike*. The only explanation given on the operation of the jet artillery was that it can fire heavy barrages much farther than conventional type weapons.—*Air Training*.

FOREIGN MILITARY DIGESTS

The Council of Europe

Digested by the **MILITARY REVIEW** from an article by S. H. C. Woolrych in "The Journal of the Royal United Service Institution" (Great Britain) November 1954.

This article was prepared for publication prior to the recent changes in the Austrian Government.—The Editor.

AS WE KNOW, Europe before the war consisted largely of countries of various sizes and shapes which all went their own way. Their only preoccupation was to see that no one member unduly dominated the rest. That was the doctrine of balance of power. After the war, that doctrine went west, or perhaps I should say went east, because of two factors. The first was the emergence of the Soviet Union as World Power II, and the second was the forcible attachment to her system of most of the countries of eastern Europe. Under those conditions, there could be no such thing as a return to the doctrine of balance of power except on a world basis. In fact, the countries of western Europe found themselves struggling to avoid the same fate as that of their eastern neighbors.

We know all about the Brussels Treaty and the North Atlantic Treaty, which were drawn up to prevent that happening, but we are not concerned with those now because they are mainly military treaties.

There still remained a political problem. The countries of western Europe, finding themselves counting for less and less every day beside such great powers as the Soviet Union on the one side and the United States on the other, felt that if they were not to be swept up into the systems of either one or the other they would have to form a bigger unit somehow. That is precisely what they are trying to do at this very moment. I must warn you at the outset that it will not be a quick or an easy business. Many people thought originally that when the Council of Europe was formed they would make one large federation in Europe. That idea is now out, at all events for years to come, and what is taking place is something much slower, more difficult, and more complicated. Therefore, one must not expect quick results.

Birth of the Council

Let us start at the beginning and ask ourselves what is the Council of Europe and how did it start? I think it really started with Winston Churchill's speech at Zurich in 1946 in favor of European

unity. In that speech he stressed the decadence which he felt sure must come to a disunited Europe. That speech fired all the European movements which were then starting, and the result was that 2 years later, in 1948 at the Hague, an enormous Congress of more than 1,000 delegates from 19 European countries was held, with most of the principal statesmen in Europe present. That Congress fathered the entire idea of the present Council of Europe, and its Charter was signed in London shortly afterward on 9 May 1949, by 10 European countries, which are: Belgium, Denmark, France, the Irish Republic, Italy, Luxembourg, the Netherlands, Norway, Sweden, and the United Kingdom. Three months later, at the opening session at Strasbourg, they were joined by Greece and Turkey, and in the following year by Western Germany, the Saar, and Iceland. That makes 14, not 15, members, because the Saar territory is not a sovereign state. Therefore, the Saar is not a full member; she is only an associate. Even so, those 15 members make up only half of Europe because the Soviet Union and her satellites did not come in.

There are six other countries who are not members, although they are certainly not satellites of the Soviet Union. There is Switzerland, who clings to her neutrality—Switzerland was not an unconditional member of the League of Nations in former days and has not joined NATO or the United Nations—and Austria, who would be a member if she could. She already has observers at Strasbourg, but the Soviets will not agree to a peace treaty for Austria and that unfortunate country is still occupied by the four former wartime Allies. The remark of Dr. Renner that Austria is like a skiff occupied by four elephants is all too true. For much the same reason the Soviet Union would not allow Finland to be a member, although she is certainly no satellite. On the other hand, Yugoslavia was a satellite until 1948, when

there was the famous row between Tito and Stalin, as a result of which Tito pulled out of the Soviet circle, although his country still remained Communist.

That leaves two other countries—Spain, who was not invited because she was not considered to be sufficiently democratic, and Portugal, who will not come in because Spain has not been invited. Nevertheless, these 15 states make up a population of approximately 255 million, as against 151 million Americans and 193 million Russians. As far as production of coal and steel is concerned, they come about halfway between the production of the Soviet Union and the production of the United States; so you will appreciate that they do make up a fairly powerful bloc.

I think that we may view the Council as a battleground between two conflicting ideas of uniting Europe. There are governments like our own who prefer to keep it on an association level—an "association at government level" is the correct term—which means agreements between foreign secretaries which have to be ratified afterward in the national parliaments. Then there are countries such as Germany, Italy, Holland, and, until recently, France, who prefer to have a tight federal union on the model of the United States. However, the Charter had to be drawn in wide, vague terms in order to gain as many members as possible and to discourage as few as possible, and in so doing they came nearer to the British idea of unity than to the Federalists' idea of union.

Council in Action

Now let us see how that works out in practice. The Council consists of two bodies. There is the Committee of Ministers; and the main body, the Consultative Assembly. The sole executive power belongs to this Committee of Ministers which consists of 14 Foreign Ministers, and at their meetings each Minister speaks for his

own country. I have said the "sole executive power," because the Foreign Ministers are the only people who can pledge their governments to carry out whatever it is the Council asks them to do.

The main body, the Consultative Assembly, consists entirely of parliamentarians, who are elected, not by governments, but by the parliaments themselves. We send 18 Members of Parliament, comprising at present 9 Conservatives, 8 Socialists, and 1 Liberal. Before the last General Election it was the other way around, that is, 9 Socialists, 8 Conservatives, and 1 Liberal. The job of the 132 parliamentarians is to draw up, discuss, and pass resolutions on a number of topics of general importance to Europe, and those resolutions are then sent on to the Committee of Ministers. If the Committee of Ministers consider those resolutions to be wild or woolly, they reject them, as they have done several times. On the other hand, if they consider that they are good, or even promising, they send them back to their own countries to be studied.

The Council is in no sense a European Parliament and has no executive powers. Many people rather rudely call it a "talk shop," and so it is in a sense; but I think you will agree that one is desirable provided that it does voice the opinions of Europeans, and does call attention to those things which should be taken in hand. For instance, the Council has drawn up about five or six Conventions, of which quite the most important is the Convention on Human Rights. This Convention on Human Rights is not just a collection of pious intentions. On the contrary, it is a practical, as well as an important, document, because it sets out in black and white what we all feel should be the minimum human rights or freedoms enjoyed by any civilized man or woman today. In passing, do not let us forget that they are not enjoyed by 50 percent of Europeans at the present time. And they

are to be enjoyed not only by European countries, but also by their colonial subjects. It was not many months ago that the British Government made them apply to 42 colonial territories, with populations—mainly colored, of course—of 78 million. Therefore, you will see that countries such as our own, with vast colonial responsibilities, have had to watch their step before agreeing to a Convention of this kind.

At the same time, two more Conventions now make it possible for a British subject working in any of the other 14 countries to enjoy the same social and medical benefits as if he were a national of the country, and the same applies to any of their nationals in this country. Another Convention seeks to clear up the disorder in European patent law, which I am given to understand is chaotic. The fifth is one by which the universities of western Europe agree to recognize each other's diplomas and examinations, so that a boy or girl studying at Oxford or Cambridge who wants to complete his or her studies, say, at Leyden, Bologna, or the Sorbonne, will be able to do so, in the future, without any of the present tiresome formalities of entrance examinations in each case.

The Council of Europe has also been discussing such subjects as refugees, which is enormously important in Europe at the present time; unemployment, which is closely linked with it, especially in a country like Italy; housing, manpower, and a host of other subjects. If anything, there is rather a tendency to bite off more than they can chew; so much so, in fact, that M. Spaak, the first President, once told the Assembly that he thought that they would probably get more done if they concentrated more and more on less and less.

Issue of Federation

You will probably have guessed that the Council had not been in existence very long before the battle was on between the Federalists and the rest. The Federalists

want to make Strasbourg the capital of Europe and to make the "House of Europe," as they call the Assembly, a European Parliament with full powers. That issue of federation was hotly debated throughout 1950, but in the end it was found that only 6 out of 14 full members really wanted a tight federation of that kind. The poor little Saar would be only too glad to federate tomorrow if she could do so as a sovereign state, but France and Germany will not agree to that. The Saar territory is only roughly about the size of Surrey, although her coal and steel are, of course, of very great importance. They are so important, in fact, that it would probably make all the difference in the world to the balance between Germany and France as to which country controls that coal and steel.

Attitude of Great Britain

Before I go any further, perhaps I should say something about the attitude of the British Government toward a possible European federation. That attitude was set out first by a Socialist administration and soon after by a Conservative one, and in much the same terms. It is that we feel that we cannot very well join a European federation because we are already members of a worldwide confederation of sovereign states which we call the Commonwealth. No member of that Commonwealth—so runs the argument—could very well join any local federation which is going to demand complete control over all its defense forces, all its finances, its coal, steel, and other resources, without hurting the rest of the Commonwealth. In fact, Lord Salisbury said recently that if Great Britain were to join a European federation, that would be the end of the Commonwealth. How could we put all of the British Army, and the Royal Air Force for that matter, into Europe when we might need them to go to the help of Australia or New Zealand if attacked in

the Pacific? Could you really expect the businessman in Vancouver or Brisbane to accept a European currency or to base his export trade on some arrangement made in Strasbourg? Looking at it from the European point of view, it was obvious that if we were to join this European federation without the Commonwealth we should not be nearly so popular.

Coal and Steel

From this discussion on federation the fact emerged that Strasbourg was not going to become the capital of Europe or the European Parliament; but that was by no means the end of the business, because the Federalists were determined to go ahead, although it was a much smaller federation than was originally desired. It was then that we began to hear about Restricted Communities, and it is these Restricted Communities which are transforming Europe at this moment. The general idea behind them was that member states would agree to the pooling of their resources in certain given fields. To take coal as an example, the members would agree to put under one body not only all their coal mines, but everything connected with coal. That in itself was a revolutionary proposal. In fact, it was coal and steel which M. Schuman proposed in 1951 should be pooled. Behind M. Schuman's proposal was a Franco-German arrangement between M. Schuman and Dr. Adenauer by which they both felt that if neither side could control their coal and steel, there could be no further wars between France and Germany; because without coal and steel a war cannot be waged. Therefore, the Coal and Steel Community was set up: the six member states being France, Western Germany, Italy, and the Benelux countries. We were pressed to join, but we could not do so as full members for exactly the same reason that we could not federate, that is to say, we could not afford to put under a strictly

European body all of our coal and steel resources when we might need some of them to honor our commitments at the other end of the world.

We were, however, able to find a way around the difficulty, and when the Coal and Steel Community set up its headquarters in Luxembourg in September 1952, under M. Monnet, the British Government sent out a high-powered delegation under the chairmanship of Sir Cecil Weir to do business with that Community, and to see how far it would be possible to work in with it in the common market which had already been established in those six countries for coal and steel. That British collaboration has succeeded to the point where M. Monnet now wishes to negotiate with Her Majesty's Government with a view to finding further fields of collaboration, and the answer of the Foreign Office has been to ask M. Monnet to come over here and discuss it with them.

European Defense Community

The next Community which was proposed was the ill-fated European Defense Community (EDC).

That meant pooling nothing short of all the armies and air forces in Europe. You will realize that it is NATO, and not the Council of Europe, which is responsible for the defense of Europe, and it was General Eisenhower, as Supreme Commander, who was convinced that it would be impossible to defend Europe without German contingents.

Ever since that view was accepted, as it had to be, the entire problem has been to reconcile French fears with a military necessity. French fears are not so far-fetched, because within living memory France has three times been invaded by the Germans.

I have been living in Strasbourg for more than 2 years and I have come across Alsations, getting on in years, who have had five nationalities in their lifetime. That gets a little tiring after a time.

I do not think that there is any point in going into the question of a European army, which was the central feature of this entire EDC project, because it has now been killed by the failure of the French Parliament to ratify the project which the French had themselves put forward 27 months earlier.

European Political Community

However, unfortunately, the damage did not stop there, because another European body went overboard at the same time. When the statesmen were discussing the question of the European army, they kept coming back to the same question of who would give the orders; who would control the army? Much the same thing happened both in the case of the coal mines and the steelworks. Obviously, it had to be a supreme body, a democratic body, and one on which the six countries were all properly represented. So in the winter of 1952, the experts sat down in Strasbourg and in Paris and worked out a constitution for western Europe called the European Political Community, under which there would be a President, an Executive Council, a Committee of Foreign Ministers *pro tem*, and an upper and lower chamber, the representatives in the lower chamber being elected by popular suffrage; in other words, a federal Parliament. The entire logic of these communities points to some such body as a Parliament to control them, but it was recognized all the way through that the fate of this European constitution was bound up with that of the EDC—and for this reason. If there is to be a joint European army, it is necessary to have a joint Parliament to control it, but if coal and steel only are being dealt with—which is the case at the moment—then it is not quite so necessary. Anyhow, for the time being it is a thing of the past.

We have been reading a great deal lately about the journeys of Mr. Eden to the European capitals and about this Nine-Power

Conference which has been sitting in London and which has, fortunately, succeeded. That was, if one may say so, in the nature of an emergency operation. It was rather like stopping a hole in a sea dike, because there certainly was a frightening breach in the wall of Western defense, and national passions had begun to flare up once again. However, the statesmen themselves recognize that the military aspect is not the only, or even the chief, one. Alliances and treaties are all very well—I sometimes think we have too many—but surely what matters most is what lies behind them. There is, for instance, the Anglo-Soviet Pact, which is, at the present moment, a dead letter because neither side trusts the other. In western Europe no ingeniously phrased treaty, no paper safeguards, will work unless the entire atmosphere of Franco-German relations is right. We have to get rid of this French dread of German aggression, as well as of German suspicion that the French are out to deny them their full sovereignty. Reconciliation between those countries is certainly necessary, but what is required is something more permanent. Partnership is really necessary. That partnership was provided for in the EDC, and somehow or other we have to recreate that sense of partnership between France and Germany and the other partners. That is where the Council of Europe comes in, because here is an organization which can do more than anything else to foster the spirit of European unity.

How will it achieve that, you may ask? Surely, the federal idea has broken down? Well, federation is only one of the possible answers. I notice that *The Observer* is constantly pushing the idea of confederation, but one sometimes doubts whether they have worked it all out. Surely the thing to do is not to waste too much time on constitution building, but rather to get on with the job which lies under our hands. That, after all, is the

way in which the British Commonwealth has developed and, as we know, it has no written constitution except the Statute of Westminster, which states that the members are free to walk out when they like. There are great opportunities at Strasbourg and a great deal of work to be done. Sometime ago they were debating what was to be done to put something in the place of the EDC, and it was right that continental statesmen of the caliber of M. Spaak and M. Mendès-France should be speaking there, because Strasbourg is the best forum in which to address not only one's fellow parliamentarians, but European opinion at large. These debates at Strasbourg in which the parliamentarians of 15 countries take part are bound to have a considerable effect on European opinion.

General European Framework

In what are called practical matters, the activities at Strasbourg are almost ceaseless. Let me give you two instances. Not too long ago an entire day was spent in discussing the convertibility of currency. Is not that rather technical and abstruse, you will say? Well, is it? If we mean what we say about seeking to rid ourselves of the remaining economic shackles which bind us, if we want to liberalize trade not only in Europe but throughout the world, can we afford to ignore the money we use to buy both food and raw materials? If we were all free to buy whatever we could afford in whatever market we chose, if we were all free to take our money at will from one country to another, if we could visit the United States without having to submit our reasons in writing to the Treasury before receiving a single dollar, would not that affect most of us?

Then the Council is also waging a heroic fight to modify some of the restrictions at frontiers, and to make it easier for us to visit each other's countries. A first-class report was drawn up sometime ago

by a committee under Mr. Montgomery Hyde, and was circulated to governments for their comments. A certain amount of progress has been made, but that progress is all too slow. I am afraid that governments are inclined to let their civil servants persuade them that all these restrictions and formalities are really necessary. They are, perhaps, necessary if one is thinking only in terms of the control of immigrants, customs, and currency, but governments are elected, according to a nineteenth century statesman, to tell the civil service what the public will not stand for, and that the rights and feelings of the ordinary man have to be respected. It is very doubtful whether all these restrictions are really so necessary. For instance, the inhabitants of the Scandinavian countries pass from one country to another without showing any passports or identity documents, and the security checks, customs, and currency are restricted to something like one or two passengers in every hundred. When the German Federal Republic abolished visas for people visiting Western Germany, the number of tourists rose the next season by 25 percent. One can only hope that the *carnet* and *triptyque*, which are necessary in Europe to move cars from one country to another, will become obsolete, as they already are between the United States and Canada; but all this will only come about by joint action at international level.

At Strasbourg there are meetings of experts on all types of subjects, from patents to extradition law, and reports are made to the Council by a number of other organizations such as the Organization for European Economic Co-operation, the United Nations Educational, Scientific, and Cultural Organization (UNESCO), the World Health and Refugee Organizations, and so on. You may ask whether there is not some duplication in all this. I do not think so, because the Council of Europe is the mouthpiece through which the

public can influence these specialist organizations and through which the specialist organizations in their turn can address the public.

However, there is a strong case for uniting many of these specialist bodies under the general framework of the Council of Europe, and for seeing that there is no duplication of functions as, for instance, the social and economic activities of the Brussels Treaty. There is every reason why European governments should not set up any more independent committees, as they have done, such as those to consider agriculture and transport. Strasbourg should be the framework for all European activities other than defense, in the same way as the United Nations focuses world problems. There is no clash between the United Nations and the Council of Europe because the Council is registered under the Charter of the UN as a "regional arrangement" covering Europe, and is, therefore, a part of the whole.

British Support

We now come to the question of what should be the attitude of the British to this Council of Europe. I can think of three good reasons for supporting it. First of all there are the political activities at Strasbourg which are bound to increase with time. If continental Prime Ministers and Foreign Ministers can go there and expound their countries' points of view, can we afford to do anything less ourselves? In any case, it is first-class experience for our Members of Parliament to meet their opposite numbers from 14 other countries, not only in debate in the Chamber at Strasbourg, but also unofficially in the large members' bar, which has a number of tables with many chairs which are so conducive to forming groups around them.

Second, I think that Strasbourg will increasingly be an organization whose services will be looked to for settling European disputes. The Council has done

a wonderful piece of work already in connection with the Saar dispute which was referred to it in June 1953. Although that Saar dispute is not yet settled, I think there is every chance that the recommendation of the Council of Europe that the Saar territory should become the first European territory is the most likely solution. We also have to be prepared for the question of the sovereignty of Cyprus being raised against us in the Council of Europe.

Third, there is the question of what will happen in the future on the continent of Europe. Sooner or later a group or bloc of powers is bound to be formed, because these countries will not go on forever dying on their feet and counting for less and less. We may, or may not, be able to join that group because of our Commonwealth commitments, but surely it is a matter of life and death to us to be associated with it on terms of utmost co-operation and cordiality. There can equally be little doubt that, as one of the founder states of the Council of Europe, we are very well placed to any bloc which may emerge from it.

Then, finally, there is the matter of our European heritage, and we cannot go

back on that, because in all the things that count for most in this world—the general standards of life, of education, things of the mind, and spiritual values—Europe is still supreme, and the civilization of Europe is still the civilization of the world. I think that Europe will continue to count as one of the great world factors so long as we decide to stick together. We have not found the right answer yet to European unity, but I do suggest that it is our duty to play our part, which must be a major part because we are the biggest member, in finding the right answer to this question of European unity.

It is pleasant at Strasbourg to see British Members of Parliament of all parties, with every session which they attend, speaking less and less as party politicians and beginning to talk more and more as European statesmen, facing, together with colleagues from 14 other countries, problems which are common to us all. That, I venture to suggest, is an attitude of mind which we can all afford to learn. It is by studying our neighbors and what goes on in our name in the Council of Europe that we are most likely to learn it.

Guided Missiles

Digested by the MILITARY REVIEW from an article by Major G. D. Hinde in "The Journal of the Royal Artillery" (Great Britain) January 1955.

Most of us would be quite content to leave the stars twinkling mysteriously at their safe astronomical distances—how snugly self-contained the world was when jokes about the moon being made of green cheese were still fresh.—The Times, 27 January 1953.

In his new book, *Development of the Guided Missile*, Mr. Kenneth W. Gatland says:

All the fighter aircraft and anti-aircraft weapons which Britain is straining

her resources to produce would be powerless to prevent an atomic attack if the main weight of the assault came from supersonic missiles instead of bombers.

In a recent *Times* editorial where the United States Army exercise *Flash Burn* was discussed and in which guided missiles were actually used, is issued a challenge to the British Army:

... where the overworked regimental officer is often too busy with his National Servicemen to study the less primitive ele-

ment of his profession. He is apt to put his trust in his seniors and the scientists—but that is not the way that Montgomerys—or Churchills—are bred.

The object of this article is to discuss the development of guided missiles in such a way that the regimental officer may have food for thought and be able to lead discussions with the troops under his command. It does not attempt to go into such technical details which are the province of the scientists and technical staff officers.

History

Like many inventions, which appear new but are, in fact, as old as the hills, the rocket was conceived long ago. In a novel by Jules Verne about 1880, he described a rocket projectile with target-seeking device and a proximity fuze. In 1901, P. Y. Alexander read a paper "on sounding the air by flying machines controlled by Hertzian waves." The V-1 flying bomb was anticipated by a French artillery officer, Rene Lorin, who, in February 1910, described his design in detail. In 1915, A. M. Low approached British authorities with a suggestion to develop unmanned radio controlled airplanes for destruction of specific targets. About 1934, the *Queen Bee* pilotless aircraft, a biplane, was developed and used for training antiaircraft gunners. In the brochure, *Guns and Gunners*, appear photos of a rocket troop of 1814 and 1838 and rocket boats of 1816, used in the bombardment in Algiers. It is interesting to note that the Treaty of Versailles forbade the operation of controlled, unmanned airplanes by the Germans.

The V-1

The wartime production cost of the German V-1 flying bomb was about \$8,400 against \$28,000 to \$44,800 for a V-2 rocket. The V-2 could be built for about one-sixth of the cost and one-fifth the man-hours required for an equivalent bomber. It was

Hitler's order that a weapon was to be built with which Great Britain could be subjected to a continuous bombardment. The V-1 had a range of 185 miles and carried an explosive charge of 1,540 pounds. We learn that out of about 8,000 missiles launched against this country during 1944-45, about 50 percent were either trapped in barrages or shot down, while 25 percent were lost through unreliability of the weapon, 25 percent reached their targets and a number of these failed to detonate. Up to 27 percent of the launchings had to be repeated and 14 percent of the missiles came to grief at once. The radio proximity fuze of British antiaircraft shells accounted for most of the missiles destroyed. This was one of the German's greatest inventions, and had it been handed to the scientists at the time, greater benefit would have come from it, to our serious disadvantage.

The V-2

The V-2 was, mainly, the idea of Hermann Oberth, a Romanian. General Becker of the German Army created the work. It needed about 30,000 parts in its construction. The majority of the workers employed were slave laborers. This was a long-range rocket as opposed to the V-1 which was a flying bomb. Its range was also 185 miles. The explosive charge was 2,160 pounds, an increase of 620 pounds. Experiments with the final version of the V-2 began in July 1942 and the first successful launching took place on 3 October 1942 over a range of 150 miles. When the original weapon had been displayed before Goering and his staff, a series of accidents caused one rocket to fail to ascend, and merely to burn on the ground; another to fall back and explode after launching; and a third to explode without moving at all. It is reported that Goering remarked on it being a fine weapon "for short-range destruction." Not so humorous was it for General Becker, who committed suicide. On 8 September 1944, the first two V-2s were

launched against London. From the Hague, 1,027 rockets were launched, 7.7 percent were failures and 600 reached the target area. Of all the missiles launched, 42 percent were ineffective. It is interesting to note that the Germans needed 6 hours to prepare a launching.

Mr. A. V. Cleaver, Chairman of the British Interplanetary Society, has written that "within the next generation the guided missile will gradually assume many of the duties of present fighters and bombers." Mr. A. R. Weyl, in his book, *Guided Missiles*, says:

To some extent, guns and manned bombers may be superseded by various forms of guided missiles; on the whole, however, such missiles will be used to implement the artillery and air force.

The Royal Regiment will be particularly interested in the guided missile in a defensive role. In a Parliamentary report which appears in *The Times* of 27 January 1953, the Minister of Supply made it quite clear that the stage had now been reached when:

We could see that surface-to-air guided missiles, together with the fighters of the Royal Air Force and the anti-aircraft guns of the Army, had a very important part to play in the air defense of the United Kingdom.

The ruling that the manning and operation of these guided weapons should become the responsibility of the Royal Air Force was given in the light that surface-to-air guided missiles were complementary to fighter aircraft, operated in the same air space and must, therefore, be under the same ground control. Within a short time of this statement, officers of the Royal Regiment were being asked by their brother officers in other arms, when they would be changing from khaki to air force blue. One of the reasons for this article is to see how serious this remark could be.

There is nothing new in this problem,

which is familiar to every gunner officer. Coast artillery can cope quite happily with a ship steaming along at a few knots, and field artillery is not particularly worried over a static target which can be ranged on and then punished at fire for effect. Antiaircraft artillery has a big headache trying to hit a small plane traveling at supersonic speed which may be in the zone of the gun for 2 or 3 seconds only. Even if the gun could fire 500 rounds per minute, the chance of hitting the plane would be slight because the sky is very vast. Anyway, the mechanism of a piece of equipment has a limit to the number of times a second its gears can rotate. Even with first-class modern layout of radar, early warning, and all the devices man can create, one would have to have knowledge of enemy aircraft about 200 miles out. Traveling toward the gun area at the speed of sound, it is only a matter of minutes, sometimes seconds, during which the range, bearing, and height can be found, fed into a predictor, the round loaded, fuze set, and fired. The gun, opening with maximum range, will be firing at a target which it cannot even see, but which it knows is on the way. It would not hear it coming until it has gone past. Allowing for the time of flight factor, always a nuisance, the shell may meet the plane. With proximity fuzes, the chances are better. The number of guns could be multiplied, with twin pieces on each equipment, or more guns per troop, but even with increased rates of fire, the problem is not simple. Against enemy planes there is a chance of destroying them with good radar and good drill. Against the V-1 there was also a good chance, but against the guided missiles of the future we require something better.

Mr. Weyl has given a list of the various uses of guided missiles in the belligerent role (see listing on page 83).

This article only covers a few of these types of missile and their possible uses,

where they have a bearing on the role of the Royal Regiment.

Ground-to-Air

This is an antiaircraft problem, but instead of the heavy antiaircraft and medium antiaircraft guns known today, the guided rocket would be released from the ground, and set off on a predetermined course to find the enemy aircraft coming in. The usual setup of radar and early warning would be required, and the target would have to be tracked from as far away as possible, so that those responsible for getting the guided missile away have as much time as possible, because it would have to be prepared, aimed, and initiated on its journey. This is where the antiaircraft gunners of tomorrow might find a new role. As the Royal Air Force would be

decided to launch several guided missiles at one time, it is to be considered whether each defensive rocket would find its own opponent, or whether each defensive rocket would make for one and the same opponent. No doubt the scientists and statisticians can assure us on that point. However, suppose one of the enemy rockets was fitted with an atom bomb, how would the defenders know which one was the most dangerous? It must never be assumed that a guided missile can be more than a mere weapon. Robots can never replace soldiers.

Royal Air Force

It has already been stated that surface-to-air missiles were complementary to fighter aircraft and one role of the Royal Air Force may be to carry the guided mis-

Air-to-air	Ground-to-air	Ship-to-air
Air-to-sea	Ground-to-sea	Ship-to-sea
Air-to-space	Ground-to-space	Ship-to-space
Air-to-ground	Ground-to-ground	Ship-to-ground

responsible for this functioning of guided missiles, the antiaircraft gunners might be required to transfer, otherwise it is difficult to see where the personnel are to come from.

Ground-to-Ground

This type of rocket would resemble the V-2 with long range and be used strategically. Strictly, however, the V-2 was not much more guided than a shell, because as soon as the motor ceased to operate, the missile adjusted itself to a predetermined angle of elevation as it virtually coasted along. It is fully expected that the German V-2 has by now been developed to carry an atomic warhead. What the outcome would be of a guided missile fired from the ground in a defensive role is interesting speculation. If the target were another guided missile, which would destroy which? The ideal would be for them to destroy each other, but if the enemy

side away from the United Kingdom and release it in midair. The missile could be left to find its own way to the target, whether it be enemy airplane or enemy guided missile. The pilot would not be required to travel any farther but allow the missile to do the job, except that, perhaps, he may correct and adjust it during its flight by electronic means of a television camera system. There are problems connected with the efficiency of the aircraft if large missiles are attached, whether to wingtips or to undercarriage. It may possibly mean a false or second undercarriage if a large missile is to be loaded centrally below the plane, and stability under supersonic flight may not be as simple as it sounds. However, if a guided missile could do the job, maybe there would be no further use for the supersonic fighter. If the battle can be fought over the water, so much the happier for the civilian population. It is obviously vital that antiair-

craft guns should not fire at such a time when the planes are battling it out with guided missiles. If the enemy target is a guided missile, the Royal Air Force has a chance of destroying it before it reaches the shores of this country.

How long it will be before the guided missiles are produced, tested, and passed as possessing all the necessary requirements is difficult, if not impossible, to estimate. According to the Stuart Report, the United States does not expect to have large step rockets before 1960. It may give the enemy a headache trying counter-measures in the way of jamming the electronic devices.

Composition

The rocket is divided into several parts, which are, in very general terms:

Warhead and fuze.

A housing for the mechanism which will

These few examples will suffice to show the different types of missiles which are being produced today to fill the many roles which they are likely to perform. From the point of view of the inside of the missile, a large percentage of the rocket must be the fuel itself, which sends the rocket on its way. The V-2 had liquid oxygen and alcohol, while the V-1 carried 140 gallons of low-grade gasoline. The V-1 shut off the valves early in order to avoid burning them out before the rocket was over the target. Solid fuel requires a careful size charge with a constant burning surface. It may also have a solid fuel boost, which falls off as soon as the rocket is on its way. This may, in the future, be made of plastic to avoid outraged citizens. The technique of launching one rocket from another has been developed and by use of the "step" principle, it is possible that a rocket may be able to

Type	Length	Diameter	Propellant weight	Remarks
V1	25-37 feet	32.2 inches	1,000 pounds	Flying bomb
V2	46 feet	66 inches	19,300 pounds	
Aerobee	18.8 feet	15 inches		Maximum altitude 372,000 feet
Mighty Mouse	3.3 feet	3 inches		Air-to-air
Soviet	1.95 feet	3.2 inches		Made in 1943
Viking	48.59 feet	32 inches		Built in 1948
				Maximum altitude 200 miles

receive, interpret, and use the intelligence about the position of the rocket as compared with the position of the target.

An equipment which will make use of the intelligence and allow the rocket to alter its course in space.

Energy which will send the rocket at high speeds in order to achieve the required range and at the same time outpace the enemy rocket.

A propulsion system in order to overcome gravity and the aerodynamic drag set up in flight.

For the benefit of readers who have not seen any figures of the size and composition of guided missiles, a few facts and figures may help (see chart above).

travel 3,000 miles. The *Viking*, in 1952, launched at an American proving ground, climbed to an altitude of 135 miles—the summit of the trajectory being reached in 4 minutes 23 seconds. The future policy of fuel may be away from liquid propellants for rockets and the increase in fuel weight of solid fuel may be accepted. Apart from the fuel, the rocket will contain a warhead if it is to do any damage, and in the case of the V-2 this consisted of 2,150 pounds of amatol high explosive. Then there are the stabilization and control devices, a steam turbine, and combustion chamber. Other types of rocket may have a radar, with scanning dish in the nose, or television camera.

Production

Production of guns requires heavy machinery, and factories making guns and planes are very good targets for the enemy. The guided missile is a feat of light engineering and the production load could be spread. The rocket engine is simpler than the aero engine, but not so simple as one would imagine. Rockets are expendable in one attack, but they are still economical when compared with a bomber which may be lost after a few missions, and the cost of overhaul and maintenance of all planes is no small matter. An American *B36* costs 3.5 million dollars and half that much again for replacement annually. It is debatable whether any country could afford another large-scale war without becoming bankrupt, but it seems very likely that if such a war should come, through no wish of our own, we must first look to our defense from the air before anything else, and in planning,

the field guns, tanks, and armor must take second place until there is an answer to the defense from guided missiles.

Research

An article on guided missiles would not be complete without reference to the projectiles which are helping science to find out more about the universe. Finding out about the weather, cosmic rays, and research into the upper altitudes will occupy scientists for years to come. The subject of interplanetary flight is one full of excitement and anticipation. The moon—our closest neighbor—may be within reach within the next century. Whether atomic energy features in such development is open to speculation. Fission produced from exhaust could contaminate the landing area and dust clouds thrown up by the blast would become radioactive. Whether we like it or not, the missile and its repercussions on our training and, indeed, on our lives cannot be ignored.

War--Limited or Unlimited?

Digested by the Military Review from an article by Air Marshal Sir Robert Saundby in "Air Power" (Great Britain) January 1955.

IT SEEMS probable that the twentieth century will be known to historians as the century of the world wars.

If we study the history of war, we shall find that for many centuries wars were fought for limited objects, and the military operations were correspondingly limited in scope and violence. Wars were largely dynastic—waged to turn out a usurper or make good the claims of a pretender—and in such campaigns it was obviously to the advantage of both sides to cause the minimum of material destruction. The ordinary people were not particularly interested, and, as far as possible, tried to carry on with their normal occupations and keep out of trouble.

Civil wars were an exception, and were notoriously bloody and bitter, setting family against family and even brother against brother. Religious wars, also, owing to the fanatical element liable to be involved, were sometimes fought with a passion and cruelty that was unusual. Even so, material destruction was not widespread, but usually directed to some limited purpose, such as the destruction of the baronial castles by Cromwell.

I am not saying that medieval wars had no aspects of cruelty—the inhabitants of captured towns, especially if the defense had been long and stubborn, were sometimes treated with savage brutality. By and large, the armies were composed of

mercenary troops, who fought dispassionately, or of peasants owing a military duty to their lord, whose main object was to get the war over and return home. The worst fault of such armies was their habit of pillaging and looting, and this was largely a consequence of their irregular system of payment.

The mercenaries, being professional soldiers undertaking fighting as a business, did not intend to get themselves killed unnecessarily. Although well aware that they had chosen a risky profession, they did not expect their generals to fight pitched battles under unfavorable circumstances, or call upon them to die in the last ditch in the defense of some fortress or other. On the contrary, armies went into winter quarters to avoid the miseries of campaigning in wet, cold, and mud. Certain courtesies were observed, and wars tended to become exercises in professional skill by the opposing generals. They were affairs of strategy and maneuver, marches, countermarches, and sieges; all strictly governed by the "disciplines of the war," as Fluellen called them.

In the eighteenth century, the discovery and development of new lands and the growth of overseas trade led to a series of colonial wars. Such wars were fought for strictly limited objects, and the forces involved were seldom large.

This pattern of campaigning persisted until the Napoleonic wars. Napoleon, after his initial successes, did not play fair. His ambitions were so vast that he refused to be bound by the rules of the game. His great armies, raised by a *levée en masse*, were inspired by patriotic feelings and by a fervid devotion to their gifted leader. However, even in the Napoleonic wars, no deep-seated national hatreds were engendered, and some sense of proportion was observed.

Napoleon's long series of campaigns had affected the lives of ordinary people to an unusual extent, and it is signifi-

cant that his final defeat at Waterloo was followed by a period of 100 years which was less marred by warfare than any before or since. Only a few minor wars occurred in Europe—the Franco-German War of 1870 was the most important—and, apart from the Crimea and the Indian Mutiny, this country enjoyed peace except for colonial troubles in North and South Africa, culminating in the Boer War.

The Change

In 1914, World War I ended the peaceful century. It was waged with exceptional bitterness and ferocity on a widespread scale, and directly and indirectly caused the loss, in little more than 4 years, of more than 10 million lives. This was quite unprecedented, and such wholesale slaughter engendered hatred and bitterness between people on a scale never before known. World War II arose directly out of the problems which World War I had left unsolved, and had its mainspring in the injustices, resentments, and inflamed feelings which were the legacy of the years 1914-18. In World War II, all previous records were transcended. Atrocities were committed on a scale never before imagined, and national hatreds were further inflamed by reckless propaganda. The civilian populations, now brought fully within the devastating orbit of war by air bombardment, suffered severely. The war raised many more problems than it solved, worsened international relations, lowered moral standards, and sowed abundant seeds from which a third world war could only too easily arise. If that should happen, the powerful weapons of mass destruction, now at the disposal of both sides, would cause unimaginable loss of life and material ruin. The work of man's hands for the last thousand years would largely disappear, and it is probable that civilization itself, as we know it, could not survive what Mr. Adlai Stevenson has called a "thermonuclear holocaust."

Even if, as seems probable, the appalling power of modern weapons and the very completeness of the destruction certain to overtake all the belligerents will make resort to a third world war unlikely, we are living in a world of tension, divided into two ideological groups quite irreconcilably opposed.

Toward the end of the nineteenth century, most Europeans were firmly convinced that civilization was making great progress, and that they could look forward to peace and increasing prosperity. Man's inhumanity to man seemed to be fading into the past and, in this country at least, man's cruelty to animals was of more concern to the public conscience.

Reasons

What has gone wrong with the twentieth century? Why has the Western World, in spite of its great efforts to stand up for liberty, justice, and truth, and its desperate yearning for peace and higher standards of living, brought itself to the very brink of universal disaster?

I think that one very important reason is that we have lost sight of our object in war, and have allowed the means to obscure the end.

In the past, wars fought for a limited object—keeping that object firmly in view—have often been successful. Wars having an unlimited object have seldom if ever succeeded, in the sense of creating a world situation more favorable than if there had not been a war, and they have always caused widespread destruction and loss of life.

Let me give an example. Russia has been involved in four wars during the last 150 years. In the first one, Napoleon attacked Russia in 1812. The immediate cause of the war was Russia's refusal to support any longer the "continental system" aimed at the economic isolation of Great Britain, but Napoleon's real object was, or became, an unlimited one. He

wished to destroy the Russian power and, as far as possible, extended his sovereignty over the vast territories of Russia in Europe. Every schoolboy knows the story of his failure and how, during the terrible retreat from burning Moscow in the depths of a Russian winter, the *Grande Armée* withered away and only a miserable remnant survived. Napoleon's power was broken by this disaster and, although he struggled on through numerous vicissitudes until his defeat at Waterloo in 1815, it was his attempt to conquer and subjugate Russia that brought about his ruin.

The next war in which Russia became involved was the Crimea, in 1854. Russia had long coveted the great warm water port of Constantinople. Observing the crumbling power of the Ottoman Empire, the Czar thought he saw an opportunity of securing this prize. However, Great Britain, France, and Italy came to the aid of Turkey, with the limited aim of repelling the Russian aggression and restoring the *status quo*. They succeeded in this aim, in spite of an almost complete lack of generalship, and the grossest mismanagement of the allied resources.

In 1904, Japan determined to stop the advance of Russia in the Far East. The Russian armies had overrun the great Chinese province of Manchuria, fortified Port Arthur, and were threatening Korea. The aim of the Japanese was the limited one of forcing the Russians to withdraw from these territories. The result caused great astonishment. The Japanese were rapidly victorious on land and sea, the fortress of Port Arthur was stormed and taken, and the Russians were thrown back behind their own frontiers.

Finally, in 1941, Hitler turned against the Soviet Union. The Soviets had signed a nonaggression pact with Germany in August 1939, and had joined with Hitler in partitioning Poland. They had done their best to side with Germany, and believed that they had backed the winning

horse. Hitler, faced with the necessity of dealing with Great Britain, feared that if he became locked in a life-and-death struggle in the west, the Soviets—in spite of the pact—would seize the opportunity of attacking him from the east. So he decided to stand on the defensive in the west, and deal with the Soviet Union first.

His object was the unlimited one of the complete destruction of the Soviet military power, and the annexation of a large part of Soviet territory, including the Ukraine and the Caucasus. In this ambitious attempt Hitler failed disastrously. This, combined with the strategic air bombardment of Germany from the west, laid Europe open to the Allied invasion and lost him the war.

Of the four wars in which Russia has been engaged since the beginning of the nineteenth century, two had limited objects and were successful, while two had unlimited objects and ended in catastrophic failure, accompanied by terrible destruction and loss of life.

Of course, there are other factors involved, but it seems to stand out clearly that, if and when we get embroiled in hos-

tilities with the Communist third of the world, we should take great care to select and adhere strictly to a limited object. Such an object was suggested by Marshal of the Royal Air Force Sir John Slessor in his book, *Strategy for the West*, published in June 1954. He proposed that our object should be "to drive militant communism back behind his own frontiers and keep it there." That seems to me very wise advice. For if we should be betrayed into a war against the Soviet Union in which our objects were the unlimited one of destroying Soviet power—possibly, as we did in the last war, demanding unconditional surrender—then, even if we gained the eventual victory, we should fail. Such a victory would be worthless if in the course of the struggle we brought about the destruction of almost everything upon which our Western standards of living are based.

If we cannot abolish war, then at least we must bring it back under control. For we have at last, after several false alarms, reached the point where unlimited war will mean general suicide and the beginning of a new Dark Age.

Helicopters for the Army

Digested by the MILITARY REVIEW from an article by Major J. LI. Waddy in "The Army Quarterly" (Great Britain) January 1955.

The whole secret of the art of war lies in making oneself master of the communications.—Napoleon.

TODAY, modern armies are dependent upon a vast system of supplies and equipment, without which they are powerless. It is the communications now which master the army and dictate its course of action. This article will show that if the Allied land forces are to defeat the enemy in any coming struggle, their mobility must be increased and, indeed, made superior to that of the Communist armies. If the

communications on land have become an anchor to mobile operations, then supply and movement by air must become the means to achieve mobility. The article will start with a description of the general problems facing the land forces in another war. The experiences of the use of helicopters will be discussed and their possible application in the military operations to be encountered will then be enumerated.

From our examination of these factors, it will be possible to indicate the basic organization and types of aircraft to be developed if helicopters are to become an integral part of the army transport system. It is not possible in the scope of this article to discuss the more interesting details of tactics and organization, which must be left to a fuller study than this article allows.

Power of Maneuver

Although the Soviet Union is building a large strategic air force, her might still lies in her massive Army and the countless Communist hordes of the Far East. Should the Soviet Union launch her armies in an attack on Western Europe, there will be a considerable lapse of time before there is any appreciable diminishing in their power however hard our own strategic air offensive can strike at the vitals of the Soviet Union. Their Far Eastern armies will hardly be affected at all, for, there, it is manpower that is the most potent arm and the rifle the most effective weapon. The main task of the Allied land forces—to destroy the enemy armies in the field—still remains as vital as ever.

A study of military history shows that when commanders have been faced by superior enemy forces, they have always striven to maneuver the enemy into positions where they might be defeated. Successful generals achieved this aim by ensuring that their army was mobile, and, therefore, they held in their hands the power of maneuver. This power is the ability to move fighting strength to the place at which a decision can be had and a victory gained. Since the advent of the gun in warfare, the power of the mobile arm has declined and the strength of armies has been developed upon mass—men and firepower. There are, however, instances where mobility has been appreciated correctly and the power of maneuver gained—the cavalry of Cromwell

and Marlborough, Wellington's infantry in Spain, and German armor in France in 1940 are some good examples. During the last war, a new mobile arm was formed—airborne forces—only to be neglected when peace came.

The tactical mobility of our Army is now slower than ever, and it is, perhaps, fortunate that the Korean conflict has opened our eyes to the facts. The outstanding fact immediately apparent was the inability of the United Nations armies to operate in strength away from the roads; a state of affairs which was only possible because of the overwhelming air superiority on their side. The Americans were quick to realize that, if they were to end this state, they must shake their Army loose from the shackles of an endless and increasing number of road vehicles: therefore, they started to develop helicopters for the movement of men and supplies, and the helicopter soon displayed the quality of being the most versatile, flexible, and valuable item of military equipment. It is from the Korean campaign that the United States Army has acquired a sense of urgency as regards the use of helicopters for military transport.

Future Land Operations

The pattern of future war on land has one outstanding feature—dispersion both strategic and tactical. Should the war spread to Europe, the Allied armies will be hard pressed to hold the vital ground there. The situation in the Middle East and Far East will be more fluid, and at the outset our limited armies will be forced to hold a few vital areas. These areas to be held are the bases from which our forces must build up to regain the initiative, and then take the offensive. While our forces are dispersed strategically over the world, tactical dispersion in the field also must be the first consideration. The progress of tactical atomic weapons will never allow the concentrations of men and

equipment as seen in the last war. The intricate and massed system of supply and organization will be the first target for atomic attack. Guerrilla forces will be a very serious threat, and will emphasize the need for firm bases for supply and for operations. It is likely that these might be cut off from each other, and, therefore, each area must be a fortress in itself and dependent upon the air for its line of communications. Again, in a conventional area of operations, the distances and frontages will be far greater than hitherto, and the rapid movement of reserves and supplies will be a bigger problem. However, as the speed of road movement decreases with the rate of mechanization, then the Army must change to air transportation; and if it is to be flexible enough for Army use, the helicopter must become the transport vehicle.

Characteristics

Before the application of helicopter transport is discussed further, it is necessary to enumerate its main characteristics. Its ability to take off and land on almost any ground makes it entirely independent of airfields. A helicopter can hover should any landing area be unsuitable, and can load or unload by means of its winch or rope ladder. It is extremely maneuverable, and the above characteristic, coupled with its slow flying ability, enables the helicopter to be flown almost at ground level or along valleys or sides of hills, in order to evade detection or to avoid enemy air attack.

As the fuselage does not have to be built to withstand high speeds, it can, therefore, be built to the most efficient shape for carrying military cargoes. At present, there are disadvantages in the performance of helicopters, the greatest being the limited payload. Furthermore, heat, humidity, and altitude all have an adverse effect on performance. Flying in

bad weather and clouds is difficult due to lack of efficient instruments, although these are now being evolved and should be in use soon to ease the difficulty. Until night flying is possible, the helicopter is a vulnerable target to fighter aircraft by day. Finally, helicopters are costly both to build and to maintain, although this should be reduced somewhat with the development of tip-mounted jets to drive the rotors, and with the advent of mass production.

Use

The helicopter does not seek to supplant the fixed-wing aircraft; but by virtue of its characteristics, it can do many things the airplane cannot do. Our own operational experience is principally limited to that of Number 848 Naval Air Squadron in Malaya. This unit of ten *S.55* helicopters has carried out an amazing assortment of tasks in the antiterrorist war. In 10 months of operations, the squadron flew 3,500 hours, lifted 11,000 troops into the jungle, and evacuated 275 casualties. The efficiency with which these operations were performed impressed General Sir Gerald Templer so much that he demanded more helicopters.

The military use for helicopters falls into four main roles—tactical, airborne operations, administrative, and miscellaneous.

Tactical

There are many possible applications of the use of helicopter transport to the phases of war. Space will not allow more than a few examples to be discussed of the great benefit a helicopter force can give to a commander in the field. First, both in attack and defense the rapid movement of reserves can be achieved, and without interference to other formations. The commander can keep his reserves dispersed and well behind his positions, but be capable of concentrating superior forces

at the decisive point, with the added advantage of surprise. Second, in assaults over obstacles, such as rivers or mountains, the bridgeheads can be seized quickly and without the need for concentrations, which are a target for atomic attack and which forfeit surprise. The buildup can then be continued from dispersed bases straight to the bridgehead, and the commander can exploit success at once. Third, in pursuit the momentum of the advance can be increased by capturing bridges or defiles ahead of the armored advance and, thus, cut off enemy groups. The range of fast-moving armored columns has hitherto been limited by the rate of supporting supply, but now the momentum could be maintained by helicopter supply. Fourth, in withdrawal maximum delay can be imposed upon the advancing enemy while still allowing our main force to break contact to prepare rearward positions. The rearguards can then be withdrawn entirely without danger of being cut off.

Airborne Operations

Airborne forces, conceived and developed largely during the last war, were an answer which could improve the power of maneuver of modern armies. There are, however, serious limitations which detract from their general usefulness, but which the use of helicopters for airborne operations will eliminate. First, there will be no need for the expensive training of specialist parachute troops. The landing of heavy equipment and supporting weapons has always been difficult—gliders could do it, but were vulnerable and uneconomical. The dropping of vehicles and heavy weapons by parachute is difficult and inefficient. Airborne troops are vulnerable without their supporting arms, and if helicopters are used not only can these be flown in directly to the exact area required but their rate of buildup is fast. One can envisage a different outcome in the Arnhem operation if helicopters had

been used. The United States Marines have recently held trial airborne assault exercises from aircraft carriers, and have landed one regiment behind an enemy's coastline in helicopters flown from a carrier under way. This method of assault, combining strategic and tactical mobility, could be of great value in dealing with the urgent situations which our Army is likely to face in the world today. In a hot war, the reinforcement of our bases, or an attack on those of the enemy, would be greatly assisted by the use of helicopters.

Administration

The complete dependence of an army upon its maintenance system has been pointed out. Not only does this system act as a brake to operations, but it also absorbs an ever-increasing amount of men and equipment at the expense of fighting troops. An infantry division needs about 5,000 men as its own administrative organizations, and a further 15,000 to back it from the main base area forward. Their task is to unload, load, move forward, and deliver everything required by the fighting troops in action. This results in a slow and ceaseless stream of vehicles along congested roads, leaving little scope for the rapid movement by tactical traffic. Because of the vulnerability of this system, dumps of supplies must be maintained along the line. Each of these areas requires more troops to guard, sort, and deliver the supplies, with still more to supply and administer those who are administering the division. The result is a military snowball.

Air transport can reduce this administrative layout, but there are disadvantages in supply by conventional aircraft which make it impracticable except under certain rather unusual conditions. Tactical supply in the field by parachute, if on a large scale, is an inefficient means of supply. The construction of airstrips in

forward areas, if practicable, would absorb as much manpower as the resulting airlift would save. These disadvantages are largely eliminated by the use of helicopters, which can take supplies from base areas directly to the users in the field, thus, making a big saving in manpower, vehicles, and time. As weather and enemy air activity may interfere with this air supply on occasions, it will still be necessary to hold a reserve pool of road transport.

A division needs about 450 tons of maintenance each day. The moving of these supplies forward from an army base area, 150 miles distant, to the division area requires 2 days, and, therefore, three hundred 3-ton vehicles are required each day. A helicopter of 3-ton payload could do, say, three round trips per day, and, therefore, 50 helicopters could do the same task. This is a simplified example, and the exact figure of savings in manpower and vehicles could only be found after exhaustive studies. A rough estimate would be that two-thirds of the administrative troops could be saved for each "gross division." An increase in the army area for the servicing of the helicopter force would reduce this figure to about one-half, which may finally make a saving of about 5,000 men and 500 vehicles for each division in the field.

Miscellaneous

The number of minor jobs which a helicopter can do is legion, but lack of space does not permit more than a short summary of them. The small helicopter will become, and is today in some cases, more necessary to commanders and staffs than the jeep for reconnaissance and liaison. The quick evacuation of casualties to base hospitals, while saving lives and manpower, also reduces the medical services in the forward area. It was estimated that 5,000 lives were saved in 1 year in Korea by helicopter evacuation. Other

tasks possible are assistance in the laying of telephone cable or gasoline pipelines, traffic control, bridge building, the carrying of long-range patrols, or as stations for television transmitters.

Types

The types of military helicopters required fall into three general categories: first, the light helicopter; second, the dual purpose cargo and troop-carrier helicopter—5 tons or 40 men; and, finally, the heavy lift—50 tons—helicopters. The British aircraft industry can provide, at present, only the first type—the *Bristol 171* or *Westland S.55*; the *Bristol 173*—14 man—will soon be available, but is not really designed for military cargoes. It is doubtful whether useful numbers of the other two types could be produced in less than about 6 years.

Operational Responsibility

If helicopters are to become the new transport vehicles of the Army, it is right that they should be the entire responsibility of the Army. It would be unfair to burden the Royal Air Force with a large increase in aircraft, with the attendant requirement of maintenance services, if they are to reap no direct benefit from it. As it is at present, a large proportion of loads carried by Transport Command are for the Army, but those aircraft operate from airfields and on routes already under Royal Air Force control. The helicopter transport force would live and operate in the tactical areas controlled by the Army. It will, therefore, be necessary to develop an organization in the Army to operate this new force. It appears that the Glider Pilot Regiment given its parent name—Army Air Corps—is the framework on which this new force can be built. This regiment already has a background of tradition and experience in Army air transport. The addition of mechanical engineer personnel from the reduced trans-

port workshops would solve part of the maintenance problem. Under this scheme, there must be co-operation with the Royal Air Force in such matters as the initial training of pilot and ground crew instructors, meteorological services, radar warning, and supply of aircraft and spare parts from maintenance units. This force must be under the command of army, or force, headquarters in the field, in order to obtain full utilization. Aircraft must only be suballotted to corps or divisions for specific operations, except, perhaps, for a squadron of light and medium types. These would be for local and immediate use within the division.

Conclusion

There is no doubt that the operation of such a force would be extremely costly. Two hundred medium and heavy type helicopters is a rough estimate of the number required by an army of three corps. Over 112 million dollars would be an even wilder guess at the initial cost, with, perhaps, 66 million dollars per year as the cost of maintenance. It is difficult, however, to relate the cost in dollars to the value of the services made possible. On the credit side must go the increased mobility of the Army, a saving in manpower, and an increase in fighting power.

If full value is to be obtained from the use of helicopters in the British Army,

then they must be accepted in large numbers as soon as possible. The decision will be a bold one, but it must be made. The tactical flexibility and the improved administrative efficiency are so great as to outweigh the additional costs of building and operating a large force of helicopters. Without such a force, our Army must remain a force of very limited mobility.

The underdeveloped state of the British helicopter industry is not in any way due to lack of enterprise in the industry, but rather to lack of government and military support. The services, particularly the Army, have been slow in making up their minds and committing themselves to development, contracts, or orders, although the recent order for 200 helicopters for the services is a good sign that the need is appreciated. However, the few which are likely to be available for the Army, and their limited capabilities, make their contribution a small one.

Immediate experience must be gained by the Army Air Corps in the operations of helicopter transport, but no British medium or heavy types are yet available. The only way to get rapid development of these aircraft is to place a large order now. To fill the gap, until these British types are developed, permission must be sought to build in this country, under license, the best of the American models.

The helicopter has developed to the extent that the Army as a whole should recognize it as the prime factor for improvement of ground tactical operations of the future. The helicopter is not solely a device to improve the lot of the transportation officer but represents a vital resource to the entire Military Establishment.

Major General Frank A. Heileman, Retired

Night Operations

Digested by the MILITARY REVIEW from an article by Major V. P. Naib in the "Journal of the United Service Institution" (India) October 1954.

THE progress of civilization is a record of man's struggle with nature either to control the forces of nature for his needs or to protect himself from the adverse effects of those forces. The tendency of the civilized man is, therefore, to draw away from nature rather than adapt himself to nature and live in harmony with it. This attitude of the civilized man toward life and nature has been largely responsible for his aversion to darkness, fog, and the extremes of weather, particularly the seasonal severities in certain climes.

During the great campaigns of Marlborough and Napoleon, by an unwritten law, both the opposing armies suspended serious warfare during winter. In like manner, the battles were largely fought during the hours of daylight, although occasional tactical moves during the night were not uncommon. This state of affairs continued until World War I, although the Boer and other colonial wars against less civilized people brought out the importance and effectiveness of night operations. Another contributing factor to the suspension of fighting during the night was the fact that the firepower of modern weapons, with their longer range and need for observation, lost their full effectiveness and flexibility during darkness.

World War I proved the increasingly important role of night operations in modern warfare. The Russians were the first who exploited the possibilities of night operations on a large scale in World War I, but only the Germans benefited by this experience as there was no co-ordination between the Allied and the Russian Revolutionary armies. This was again a case of a less civilized or poorly equipped nation fighting against an enemy equipped with superior weapons and better organ-

ized. The only way in which enemy superiority in weapons and firepower and, quite often, adverse terrain can be overcome is by night operations. The Mahratas were adept at night operations and their success against the vastly superior Mogul armies was due to their training and reliance on night operations. History repeated itself during World War II. The vigorous emphasis on night operations during World War II was due to the early recognition of this need for neutralization of superior enemy firepower and technique by operating during the night. The Allies during the initial stages and the Soviets throughout the war demonstrated the effectiveness of night operations in the face of enemy superiority in firepower on the ground and particularly in the air. Similarly, during the final stages of the war, the Germans had to rely on night and fog as their allies when confronted with the Allied supremacy in the air.

More recently, the Korean conflict has given the Western nations a very rude jolt and has considerably shaken their complacent confidence in their technical and firepower capabilities. For the first time, the Western Powers had to face the mass attacks of the Communist hordes delivered during the hours of darkness and, quite often, in inclement weather. These attacks were always pressed home without regard to casualties and, in the majority of cases, they were successful. This new threat to the fire supremacy of the Western Powers, and particularly the United States, has set them thinking about the means of restoring this fire supremacy during darkness in order to meet the numerically superior horde armies of the Soviet Union and China. True to their genius for technical and scientific

developments to solve their problems, the Western Powers are focusing their attention increasingly on solving the problems of night vision scientifically. Considerable research and experimentation are being carried out in the use of radar, infrared rays, and other methods of battlefield illumination by artificial light.

Scope

Operations at night include both action and movement. There is a tendency in some quarters to restrict the scope of night operations to attacks with limited objectives. The scope of night operations is very much larger. A resourceful and daring commander will not only attack during the night but also exploit his success by movement during night in order to gain operational advantages. This is particularly important when operating against a night-shy enemy. At present, we have become night-shy partly due to lack of experience and mainly due to the absence of a proper emphasis on night training. Our night exercises usually appear to terminate with the reorganization on a limited objective. In regard to the use of armor during darkness, even a remote suggestion is apt to draw loud protests. While the antitank gun has apparently compelled the tank to do long-range sparring at the expense of its mobility, there is a reluctance to resuscitate its mobility even during darkness when its chief enemy is blind and immobile. Grim indeed are the prospects for the effective use of tanks in the face of such inertia.

A successful attack delivered during the day or night can only be exploited by ruthless movement, both during the day and night, particularly the latter. According to General Manteuffel, the German Panzers in the Soviet Union went a step further by breaking through the Soviet lines during the night and successfully supporting an attack next morning from the rear of the enemy. The demoralizing effect of such an action can easily be im-

agined. Long night marches through enemy held territory both by German infantry and armor were quite normal during the Soviet campaign. Some of the German commanders were agreeably surprised when the Allied armies in Normandy did not make use of the night for the breakout and pursuit. If the Allies had ruthlessly pressed home their success by movement during the night, it is the considered opinion of many German generals, that the stalemate on the Rhine could have been avoided and the war could have been terminated much earlier.

Night Vision Problem

The problem of night vision has two aspects—the physical and the psychological. The physical aspect relates to visibility or lack of it. As a consequence of this, night affects the imagination as well as the nerves. The tendency is to imagine dangers which do not exist and this effect on the imagination is heightened or emphasized by the exaggerated reaction of the strained senses. Even well-disciplined troops are affected by the influences just described. This explains why the civilized man in particular, living in the cities away from nature, dreads the night. It also explains why less civilized people or those living close to nature, are not afraid of darkness. The reliance on artificial aids to solve the problem of night vision is, in a sense, a confession of failure on the part of civilized man. At night and in forests, scientific and technical gadgets lose some of their glamour and the complete scientific solution to the problem of night vision is not likely to be achieved in the near future. These facts are of tremendous significance to the soldier, who is required to fight in future wars, and more particularly to the Indian soldier, who has to rely more on his individual skill and toughness than technical aids for the simple reason that these aids may not be readily available to him. We, in India, must, therefore, solve the

problem of night vision by night adaptation and intensive training in night operations. Technical aids like infrared rays and artificial illumination are, at present, only of theoretical interest to us. It should also be remembered that these technical aids, particularly artificial illumination, are apt to have an adverse effect on the natural night adaptation of a soldier trained to rely on such aids. It is common knowledge among soldiers with any experience of night operations, that even a temporary and limited use of ordinary flashlight adversely affected the troops and it was sometime before they could regain their night vision and continue movement. That is one of the main reasons why color filters were used to cover flashlights, taillights, and other means of limited illumination. In this article, operations in moonlight, and particularly in full moon, are not considered because of the risk of losing the element of surprise. In any case, troops trained to operate during complete darkness can certainly take full advantage of moonlight whenever it is available.

Technique

Only well-disciplined troops properly trained in the technique of night operations are suitable for the successful conduct of daring and far-reaching night operations. These operations require a very high degree of integration between the components of the force undertaking them. In this article, the technique of night operations is considered under two headings—night actions and night movement.

Night Actions

Before a night attack can be launched, there are certain prerequisites which must be fulfilled. First of all, previous contact should have been established. During this contact, by means of intensive reconnaissance, the location of enemy defenses must be determined. This is followed by a detailed plan of action which should lay

down clearly, among other things, the routes of approach, the assembly place and the line of departure, the direction or axis of attack, the plan including defensive fire tasks, and the bringing up of weapons and supplies for reorganization. When planning, it must be remembered that the night operation is not entirely tactical. The commander must ensure that the plan "caters for those minor administrative problems so simple by day and so chaotic in the dark."

In the attack as well as defense, the success of night action is based above all on the element of surprise. Loss of surprise will mean that an attack is stopped too soon or its tempo is reduced. Therefore, intensive preparation and secrecy are the keynotes to success. This includes the movement of troops before they reach the line of departure. The movement of vehicles, particularly tracked vehicles, must have noise cover as well. Once the assaulting troops leave their line of departure, the maintenance of direction is their main problem. This is solved by making the plan of attack simple and selecting the line of departure directly opposite to the objective. Any change of direction during a night attack is apt to be very dangerous because, as it has happened on certain occasions, the assaulting columns may never reach the objective and end up in quite a different place. For that very reason the objective selected must be definite, distinct, and visible—otherwise it will have to be indicated by tracer, airbursts, or other means. This will, of course, mean loss of surprise. Selection of a definite objective and selection of a unidirectional axis will also solve the difficult problem of co-ordination between the assaulting columns, although the troops will be marching in close order.

The use of tracer from anti-aircraft artillery and the indication of the objective by means of airbursts or other means no doubt facilitates direction keeping, but the

advisability of using such aids should be weighed against the consequent loss of surprise. Similarly, in regard to the fire support for a night attack, the commander must decide whether he should launch a silent attack and achieve surprise, or whether he should put in a noisy attack with artillery support and sacrifice surprise. The best course is to aim at achieving surprise by a silent attack with the fire support program on call. The important point to remember about the fire plan is thorough preparation and detailed briefing of the unit and subunit commanders. This briefing should enable the subunit commanders and, particularly, the forward observers to orient and map spot themselves during the hours of darkness. By means of a reference round of airburst, and sometimes even without it, they should be able to bring down artillery fire on previously registered targets. This cannot be done unless the officers have been trained in the location and engagement of targets at night.

When all the conditions mentioned above have been fulfilled, success will depend upon the rapid and energetic execution of the plan. Once the attacking units leave the line of departure, the movement of our attacking columns must be silent and continuous until the objective is reached. There is no question of having intermediate objectives and new lines of departure. The advance must continue without halt because any delay en route may easily result in loss of surprise and failure. Coordination between different subunits is very difficult during night attacks. Until contact is made, there will be very little occasion for the assaulting troops to use their personal weapons. Even after contact, hand-to-hand fighting and the technique of close combat will be the "order of the night." Fire discipline must be very strict and troops should not fire except at pointblank range. This ensures surprise, and prevents indiscriminate firing and pos-

sible casualties to our own troops. In the event of a unit or subunit reaching the objective ahead of others and losing contact with its flanking units, it should automatically start reorganizing itself for all-around defense.

The use of armor on a very dark night is normally limited to its participation in the fire plan and reorganization phases. Engagements of targets by tanks at night will be exceptional. When they do occur, the targets will be normally on the flanks of the objective and the tanks will have to be suitably deployed much earlier and carry out their registration. However, the importance of tanks being ready to move up during the night immediately following the capture of the objective should not be underestimated. The demoralizing effect of finding tanks on the objective, when the enemy puts in a counterattack supported by his own tanks the next morning, will be considerable. This will also facilitate rapid exploitation of success either during the same night when suitable routes of advance are available or immediately after dawn.

If tanks are expected to assault during a night attack, they must do it in cooperation with infantry over suitable terrain. For such attacks it is best to choose either a light night, that is, a moonlight night, or arrangements must be made for artificial fighting light by means of searchlights or parachute flare bombs. Direction keeping is facilitated by ordering the tanks to move on to the bursting shells over the objective. The attack should be on a narrow front with tanks moving in close formation. A squadron of tanks should not cover more than 500 yards. The simplest formation, that is, line or column, must be adopted. In line, the tanks march by the center where the commander of the subunit should be.

Attacks by tanks at night should be rehearsed in order that every commander and driver shall be quite clear as to how

far they should go, their direction of advance, and what action they are to take in the event of various forms of enemy retaliation.

Only thus can the commander achieve cohesion and control, without which there is no probability of success.

Night Movement

Some aspects of night movement before a night attack have already been considered. The tactical movement of units and formations as a preliminary to night or day operations does not present any problems, although the need for training in night marches along roads, and night traffic discipline should be borne in mind by commanders at all levels. The conduct of these moves is a matter of routine and so well known that there is no need to make special reference to them.

Movement through enemy held territory by operational night marches, particularly by armor, has tremendous possibilities. As already indicated, the Germans carried out such moves against the Soviets in the last war with success. Such moves should be attempted after the obstacle belts have been breached and the main enemy defenses have been broken into. The effect of an armored breakthrough in strength continuously during day and night will spread consternation and demoralization among the defenders in addition to preventing the movement of their reserves and the disruption of their communications. According to General Guenther Blumentritt, who has considerable experience in such operations:

The armored breakthrough in strength does not mean that the night march of entire armored divisions, because the length of such a force, even when split up into two columns along parallel routes, would be prohibitive both in time and space. In any case, the bulk of armor hardly ever gets a chance to drive and the result is senseless fatigue.

He, therefore, recommends that the advance must take place in three or four columns of compact combat teams. Where the paucity of roads makes this impracticable, General Blumentritt recommends that only advance detachments should be pushed forward. The division itself can start smooth driving at dawn.

Various aids for keeping direction and cohesion during night marches have been devised and practiced. The visual aids include pinpoint taillights with different colored masks to indicate subunits and commanders, Very lights, and other similar items. However, the most ingenious and effective, and, at the same time simple, aid was the use by the Germans of bicycle reconnaissance at the head of motorized troops. The need for reconnaissance is universal in all operations. This need is particularly important in night marches because of roadblocks, demolished bridges, and enemy antitank fire. The advantages of bicycle reconnaissance for operational night marches are, therefore, obvious. Speed is no problem because bicycles can move at night as fast as motorized troops, if not faster. The movement of the latter without lights is bound to be slow and interrupted by occasional stops. On the other hand, bicycle reconnaissance is almost noiseless, the riders can dismount and take action quickly, and, what is more important, they can see and hear better than motorcyclists and personnel in tanks or motor vehicles. General Blumentritt further recommends that these bicycle reconnaissance troops should be handpicked for their initiative, dash, and alertness. Their strength need not exceed 10 to 12 men and they should include some engineers. These troops should be equipped with light weapons because they are not supposed to fight but only to reconnoiter and investigate the road.

The superiority of troops fighting around the clock over troops fighting only for half the time during daylight is obvious. The effectiveness of modern weap-

ons and the tremendous influence of air-power on ground operations compel armies to operate increasingly during the hours of darkness. These night operations should not be restricted to limited objectives or limited penetrations. Major operations in the future should contemplate fighting around the clock, both by day and night, to achieve speed and surprise. In order

to be ready for such operations, night training in our Army needs a complete reorientation and, certainly, very much more attention than at present. In night training, the emphasis should be more upon night adaptation and the development of night vision than upon the reliance on large-scale artificial illumination or complicated ultramodern devices.

Saseno--Moscow's Gibraltar

Translated and digested by the MILITARY REVIEW from an article in "Soldaten Zeitung" (Germany) 1 November 1954.

THE strategic significance of the Mediterranean has caused England to secure herself from Gibraltar to Cyprus. Since the construction, by the Soviets, of a base on the Adriatic coast of Albania we may well wonder, however, whether this system of securities would not be subjected to a very severe test in the event of war. The Valona Bay area and the island of Saseno lying off this area have become a Soviet submarine base and naval fortress of considerable significance. From here, the coast of Italy facing it is threatened by rocket weapons, and the entire Mediterranean is subject to attack by submarines.

The little and unobtrusive island of Saseno at the entrance to Valona Bay possesses an area of about 2.7 square miles, is only moderately arable, mostly barren of vegetation, and consists almost entirely of reefs and rocks, some of them rising nearly 1,000 feet out of the water. One who knows the island involuntarily compares it with Gibraltar for, from the standpoint of the possibilities of fortification, it is as well favored as the "British rock" and, like the latter, is honeycombed by an extensive system of subterranean passages and caverns.

The city of Valona which extends along

the bay has about 9,000 inhabitants. It was spared by the last war.

The island of Saseno, key to Valona Bay, is less than 45 miles by airline from the Italian Adriatic coast. Thus, Taranto, Italy's principal naval base, is within the reach of rocket weapons. The casemates of Saseno, according to reliable reports, are large enough for troops, ammunition, and rations. Existing natural obstacles would make any landing attempt difficult. On the south and west, Valona Bay, with the cliffs of Cape Linetta and the Karaburun Mountains, whose highest peak is 2,460 feet, form an effective bastion. Farther to the south, the mountains rise to a height of 6,250 feet. Their passes, which are few in number and very narrow, could be held with but relatively small forces. The opposite end of the bay north of Valona, also possesses a natural barrier in the form of a half-mile deep stretch of boggy terrain extending along the coast for a distance of 6 to 9 miles. Kanina Peak is located less than 2 miles south of the city and rises to a height of almost 4,000 feet. It constitutes an ideal observation point commanding the entire inner bay.

It is astonishing that Saseno, in view of its strategic characteristics, was prac-

tically disregarded before the Soviets, with the help of their Albanian operation groups, appropriated it for their own use. The first move was made toward the end of World War II, when a small band of Albanian partisans occupied this island area which had been abandoned by the Italians—Italian territory since 1920—almost without fighting. Albania became a Soviet satellite state and the leader of the partisan units received his instructions from Moscow.

Buildup

Soviet Operation *Saseno* began systematically in the summer of 1948 after the break between Tito and the Kremlin. In July of that year, a modern torpedo boat under the Albanian flag, entered Valona harbor. A group of Soviet engineer officers and civilians, who proved to be "German experts," landed. These Germans were fortification construction experts and rocket projectile engineers who had been detached for a special mission.

Not too long after this, transport vessels arrived and discharged load after load of poorly nourished, wretchedly clad human beings at the port. These people were immediately placed in hurriedly established camps surrounded by barbed wire and guard towers. They were persons who had been deported from Soviet controlled countries, principally the Baltic nations. They were joined by all persons capable of performing labor from Valona, and the inhabitants of the smaller villages within a radius of about 25 miles. They were registered for work on a "construction project."

After 4 years of ceaseless work—the work was done in three shifts—the objective was practically attained in the fall of 1952. Numerous rocket batteries, the heaviest of which have a range of about 50 miles, as well as effective antiaircraft artillery protection, were constructed there. Like *Saseno*, the Karaburun Mountains

extending southward from this area have been fortified with hundreds of positions for light and heavy weapons. On Ravina Peak is a radar station whose effective range extends across the narrow strip of sea clear to the Italian coast, and it goes without saying that it is used for all-around air observation. Three airfields have also been constructed with subterranean fuel reservoirs and storage facilities for replacement parts and underground hangars—one at Valona, the second south-east of the Dukatit Valley, and the third east of the Sushitsa River.

The operational center of gravity of all of the installations, however, is the submarine base in Valona Bay. Between the cliffs of the broken coast are numerous small inlets which are ideal hiding places for submarines. These have been carefully modified so as to be scarcely discernible from the air. These submarine stations afford room for about 100 units, 50 or 60 being reported there at the present time. If this figure is correct, one can best obtain an idea of its significance if one considers the fact that Germany entered the war in 1939 with a total of 60 submarines ready for operation.

The danger that would threaten in case of war is obvious. The Atlantic Pact nations are strongly dependent on the oil deposits of the Middle East for their oil, a fact which occasions no little anxiety on the part of the staffs of the Paris headquarters. The great joint maneuvers of the English, Italian, and Greek naval and air forces 2 years ago may be regarded as an indication of this. In spite of the favorableness of this situation as regards the Soviets, there is, nevertheless, one undeniable obstacle in the way of the *Saseno* fortifications and the Valona submarine base: Tito's Yugoslavia blocks the land communications.

Saseno was awarded to Albania after the previous annexation of that region by the Albanian partisans.

Day or Night Attack for the Infantry?

Translated and digested by the **MILITARY REVIEW** from an article by George Lieb in "Wehrwissenschaftliche Rundschau" (Germany) October 1954.

IN WORLD War II, an infantry attack on an enemy position was usually begun at dawn and preceded by an artillery bombardment. Depending on the ammunition supply, this usually lasted from 5 minutes to 1 hour. In especially favorable cases, this fire preparation was followed by a supplementary bombing attack by tactical aviation or a rocket launcher unit. The two latter supporting means could, however, be used only at points of particularly intensified effort. In most cases, the infantry was supported only by division artillery but, in a few cases, army artillery was available.

When the artillery preparation came to an end, there was almost always a pause in the firing during which the infantry, at most supported by its own heavy weapons and now and then by assault guns, was forced to traverse the area in front of the enemy position without cover and break into the adversary's main line of resistance. Sometimes the infantry could not even take advantage of the bombardment to work its way forward to the enemy position because in the attack order the beginning of the attack almost always coincided with the termination of the bombardment, and until this moment arrived the infantry remained in its jumpoff position. The best time for the approach, the time when conditions were most favorable for it, was lost.

Painfully, then, and depending on its own resources, the infantry worked its way to the enemy's main line of resistance. Support by heavy weapons during the infantry's penetration could never be more than slight—except when assault guns were available—and this support, especially in the main line of resistance and on the main field of combat, was only of a protective character. Just at the mo-

ment when the infantryman had to rise to his feet to make the attack, the supporting fire of the heavy weapons had to be halted in order not to endanger him. Until it could be redirected at a new target, there ensued a forced cessation of fire and the infantry was unprotected.

The infantry's own artillery now discontinued its support almost entirely and occupied itself with the combat of the enemy artillery or, because of the enemy's ground support aviation which was now beginning its attack, it sought to conceal its presence temporarily.

From the beginning of the attack to the moment of penetration into the enemy's position, the infantryman was exposed, more or less without cover, to the defensive fire of all the enemy's heavy weapons, his light infantry weapons, and his ground attack aviation and, as a result, his losses were usually correspondingly high.

Results

Once the infantry had effected a penetration, it immediately had to count on enemy counterattacks. When these counterattacks were conducted in organized trench positions, the infantry's heavy weapons were able to give but little aid in repulsing these attacks.

If, however, the infantry was not successful in its attempted penetration, this often meant almost complete annihilation for the isolated unit, for the withdrawal from the undamaged enemy position to the infantry's own jumpoff position had to be made in daylight and in the concentrated fire of all the enemy's weapons.

If a breakthrough had been effected and counterthrusts and counterattacks successfully repulsed, the infantry was often

without the support of its artillery in attacks on other centers of resistance in the enemy's rear areas, as the artillery was now obliged to change its positions and could no longer give support from the old positions from which it had laid down the preparatory fire for the attack.

The effects of our own fire preparations on the enemy's system of positions may be said always to have been ridiculously small. Even wire obstacles and mine barriers were hardly damaged and the few direct hits—and only these have any effect on organized positions—on rifle pits and bunkers naturally caused the enemy few losses, hence, the enemy's capacity for defense was scarcely affected. Moral effects which, in the case of a "soft" adversary were often considerable, were practically nonexistent in the case of the Soviet soldier, for example. Rocket launchers, also, produced astonishingly little effect on an adversary who was dug-in. Aircraft weapons were, likewise, entirely without effect in such a case.

Losses

Our own experience in defense confirms the following: the German infantry losses by artillery in defense were relatively small. In the case of an infantry regiment which was engaged on the southern Soviet front in 1943 and 1944, they amounted to from 10 to 12 percent of the total losses. Most of the losses were caused by mortars—around 70 percent; infantry weapons came second with about 15 percent; and artillery and rocket launchers were third.

We learned from the statements of prisoners that the Soviet losses were of the same order, with respect to cause, as were ours—percentages were not obtainable.

In addition to this, an artillery preparation which lasted but minutes did more harm to the attacker than to the enemy. To the latter it was also a call to awaken. He knew that the enemy attack was now

coming and was able to take the necessary steps for defending himself and prepare a warm welcome for the attacker.

Dodging of the enemy's barrage fire occurred only in those cases in which the attacking infantry was able to take advantage of its own preparatory fire for making its advance.

Our own light infantry weapons, however, became fully effective only immediately before and during the breach while, on the contrary, the same weapons, in the case of the defender, became fully effective when we were but half way to his position. Assault guns, mortars, and heavy machineguns showed themselves to be the best support weapons for the attacker. With good training and thorough coordination with these weapons, the infantryman was able to crush most enemy resistance, provided he had first effected a penetration of the enemy position.

The fixed tactical method which always stipulated early morning as the time for the beginning of the attack was outmoded, rendered impossible the necessary tactical flexibility, was no longer adapted to the effects of the weapons that were in use, and was productive, therefore, of unnecessarily high losses.

For this reason alone, success was becoming more and more uncertain with the enemy knowing the kind of attack for which to prepare himself.

It was shown that in all cases where this method—an attack in daylight with preceding artillery preparation—was departed from and the attack begun at nightfall or during the nighttime, and preparatory fire purposely omitted—the surprise factor thus being exploited—surprising successes were recorded and, in addition, these were achieved with gratifyingly small losses.

Attack in darkness—designated simply as night attack—offers a number of very important advantages to the well-trained and well-led attacker.

A day attack can never be a surprise attack—in the full meaning of the term—to a defender, and especially when it is introduced by a preparatory fire of greater or lesser duration and involves an advance over a greater or lesser stretch of terrain. In addition to this, the assembly can be seen by observation or air reconnaissance unless this phase takes place during the preceding night. A night attack, on the other hand, cannot be detected by the defender until the attacking infantry is directly in front of his position—that is, when it gets into the zone illuminated by flares or within range of listening posts.

Naturally, there can be no preparatory fire by the artillery or other heavy weapons. These weapons get their ranges in as inconspicuous a manner as possible during the days preceding the attack, and make themselves known only when the attack is clearly recognized as such by the defender and his heavy weapons begin to lay down a barrage. They then combat the defender's heavy weapons, especially his artillery, cover the flanks of the penetrating forces, or its withdrawal. Never must they betray an attack by premature fire. They must not "awaken the defender" and warn him, as was generally the case during the last war.

If a penetration is rapidly and smoothly effected and the enemy's heavy weapons scarcely go into action or do not go into action at all, one's own heavy weapons will, perhaps, remain entirely silent in order to keep the defender completely in the dark with regard to what is occurring.

A night attack can begin as darkness is setting in or later, in faint moonlight or starlight, or exceptionally, even at dawn. The decisive factor in the matter is the attack objective, the distance to it from the jumpoff position, and the general nature of the attack. If, for instance, it is to be developed into a breakthrough and

reserves are to push on into the enemy's rear, the attack must be started as early as possible in the night in order to be able to take as much advantage as possible of the darkness. In any case, however, the night attack constitutes an unforeseeable surprise for the defender.

Concealment

If a daylight attack has begun, movement on the field of battle as well as back of it is no longer possible without the defender's observing each of these movements and, therefore, being able to combat them.

Losses of personnel and the destruction of matériel are the logical consequences. Reserves intended for the point of main effort, for example, have often suffered heavier losses during movement to the front than the attacking units themselves.

These disadvantages disappear for the greater part in the case of the night attack because night covers all movement with the concealing cloak of darkness. If, however, movement should be discovered by aviation, or harassing fire should be laid down on any route that is being used, it is easy to escape this difficulty, to detour around places that are under fire or which are only threatened, for terrain which in daylight is open to observation may be used without hesitation at night.

The assault infantry is able to approach the enemy position erect, and cover from sight is easily found, although the same cover in daylight would be inadequate. If a penetration fails at a given point, a withdrawal at night is easier than it would be in the daytime, and with a slight lateral shifting of forces, the attack may be repeated at some other point.

All movements on the field of battle can be carried out much more rapidly after night than they could on the same terrain in the daytime, for no portion of the terrain has to be avoided hence, the shortest route can be chosen and, in spite of the

enemy's proximity, the infantryman is able to walk upright. Supply of the front, especially in regard to ammunition for the fighting forces, transportation of the wounded to the rear, and messenger activity are not nearly as difficult as in the daytime.

Barrage Fire

In a daylight attack, it has hardly been possible for the infantry to escape the barrage fire of the enemy, or even his aimed fire at considerable ranges. Many an attack has gone to pieces with heavy losses in front of the main line of resistance under the concentrated fire of the defense weapons, or a penetration which was finally effected, has been only a victory of the "Pyrrhus" type.

If the night attack can be carried to a line immediately in front of the enemy's main line of resistance before being detected, the attacking unit can no longer be taken under fire by the enemy's artillery or heavy mortars. Fire against its flanks from infantry weapons is hardly to be expected any longer, for those portions of the enemy position that are not being attacked but are located to the sides of the attack sector, can see almost nothing and, in addition, must keep their eyes on their own forefields. The attacker who is breaking into the position will, therefore, be under the fire of only light infantry weapons whose fire, moreover, can only be roughly aimed at night, in contradistinction to the case in the daytime. An additional advantage for the attacker, at the same time, is the fact that he is able to see the cones of fire of the enemy's machineguns as a result of their use of tracer ammunition. One can simply take cover at the proper moment from the sweeping fire of a machinegun when it is firing with tracer ammunition, and an experienced rifleman is able to make skillful use of this for approaching the enemy position.

As we have already mentioned, the attacker is met frontally, only, by poorly aimed infantry fire. At this moment, every rifleman is still in full possession of his strength for he has been able to cover the distance between the lines without combat and generally at a walk. In addition to this, with the exception of possibly slight casualties, the unit is still at full strength and morale, consequently, is normal.

The enemy will still be partially in a state of surprise, is easily thrown into confusion in the case of rapidly conducted penetrations of his position in the dark, loses his orientation with regard to the situation, and is obliged to fight without the support of his heavy weapons.

He is not immediately able, however, to perceive the true intention of the attacker, but at first believes—adjoining units are prone to do this—that he is merely confronted by a patrol or an assault detachment, as a night attack must be initiated on a very narrow front.

Uncertainty

If the main line of resistance is quickly broken through and attackers suddenly appear on the flanks and in the rear of the defender, panic and rout may easily ensue and spread in every direction. Actually, less difficulty is encountered in rolling up a position at night than may, at first, be thought possible. A defender in an inclosed position easily becomes uncertain and abandons it because in it his view is obstructed.

Because of these conditions, it is also obvious that the defender will hardly consider attempting counterthrusts. Since his headquarters and his artillery are "blind," signal communication lines are often cut, and the situation is, therefore, difficult to appraise, his heavy weapons are often not employed, nor are counterattacks made. Numerous examples from the war, especially on the Eastern Front,

confirm these statements. It was also observed that the Soviets, for example, had no great love for night combat. In the event of a night attack, concealed as they were by the darkness and able to escape the eyes of their officers and commissars, they were prone to flee or to desert to the Germans.

In the case of an organized position, the clearing of passages through any existing wire obstacles or minefields is the task of attached engineer detachments. This is a task which is always difficult and dangerous in daytime, yet it becomes easier and safer at night. The engineers carry with them the proper means for the elimination of the obstacles, whose presence and nature have been determined previously by means of air reconnaissance, patrols, and observation. These are elongated charges for blowing up the wire obstacles, rolls of primacord netting for mine obstacles, and mine detecting apparatus. Further explanation is not needed of the fact that the work which the engineers are required to do in a night attack can be done more easily and rapidly under the protection of darkness than in daylight. Wire obstacles can also be breached without detection by wirecutting detachments equipped with wirecutters. If it should be necessary, these night tasks—if prematurely detected by the enemy—may be performed with the additional aid of smokescreens for concealment from the illumination produced by flares.

Enemy Aviation

It is self-evident that in a night attack, the enemy air arm such as reconnaissance and ground support aviation—which attacks the infantry and forces it to the ground—is almost entirely eliminated from the scene. This fact is of particular importance where general enemy air superiority exists. Only tactical night bombers, as a rule, are employed against artillery positions and columns on roads. There is

little cause for the man on the ground to fear these at night however, for they can both be heard and seen and, as a rule, one is able to get out of their path or to take cover for protection.

Heavy Weapons

Changing the position of the heavy weapons such as the artillery, antitank guns, infantry guns, and mortars has always been difficult in daylight because covered movement, as a rule, has been impossible. As these weapons were moved forward without cover, they were observed, suffered losses, and arrived late at their new positions. All too often, the infantry had to get along without their aid.

This problem is easily solved at night. If the heavy weapons have completed their work in the attack, they may immediately be moved forward, quietly seek suitable positions, and be ready in the morning for new operations in positions as yet unknown to the enemy.

Small Losses

In most cases, heavy losses in an attack—although there are naturally exceptions—are a sign of poor leadership and preparation. "The greatest attack successes with the least losses," must be a basic principle of all tactical leadership. Night attacks present an excellent opportunity for the attainment of this objective.

The facts brought out in the foregoing paragraphs definitely support this assertion, and the best proof of it is constituted by the experiences which the German infantry was able to gather, especially on the Eastern Front, although, unfortunately, all too little use of the possibilities of the night attack was made. Even attacks which had lasted an entire day without producing any success, when resumed under cover of darkness, soon reached their objective with almost negligible losses.

A unit which achieves good successes with but few losses acquires great confidence in its command and is, therefore, always an eager and reliable combat instrument to have available.

Ammunition Expenditure

A factor which is not to be overlooked is the saving in ammunition of all kinds that can be made in favor of the attacker in a surprise night attack.

Since there is absolutely no fire preparation to be conducted by either artillery or aviation, and support of the infantry during the attack is often unnecessary providing the attack is developing successfully, the major part of the ammunition supply becomes available for the intensive combat of new objectives in the further breakthrough during the day which follows, or for the repulse of counterattacks. In view of the enormous quantities of ammunition used by modern weapons of a high rate of fire, this is of great significance.

An imposed silence or reduced action on the part of the heavy weapons as a result of ammunition shortage—which was often the case on the Eastern Front during World War II—may be largely avoided by the saving described in night attacks.

Even the infantry saves ammunition, since the fire fight does not take place until the attacking forces are very close to the enemy position or sometimes even as late as when effecting the penetration. This is very important for the ammunition consumption of the machine pistols—which are especially suited for night combat—is very high.

Disadvantages

That the infantry night attack, as contrasted with that conducted in the daytime, has also a few disadvantages is entirely obvious, yet, these are very easily outweighed by the aforementioned advan-

tages. The main disadvantage is that the attacking unit must be very well trained and drilled especially for night combat. Equally high qualifications are necessary on the part of the lower commands, although these commanders are often able to give a more mobile form to their command in darkness than in daylight.

In addition to this, the defender is more easily able to escape destruction or capture by means of flight in the darkness without being hampered by observed fire.

One's own observation of the field of combat is almost impossible at night, and must be limited to the observation of pyrotechnic signals that have been agreed on in advance. This can make tactical command somewhat difficult if this disadvantage is not compensated for by means of a good, fast operating radio network—ultra-shortwave voice radio for the units, from the rifle platoon to the battalion, and the heavy infantry weapons.

Except for the employment of night fighters or bombers for the combat of enemy artillery and heavy weapons positions which betray their location by their muzzle flash or whose positions have already been learned by previous reconnaissance, there can be no support of the infantry attack by tactical aviation. Little such support was given during the last war.

Preparation and Execution

For the execution of a night attack, the following preparations must first be made:

1. *Accurate reconnaissance and study of the terrain.*

The principal aim in this is to gain an accurate picture of the enemy's defensive system. The best basis for this is provided by good air reconnaissance. The aerial photographs are to be supplemented by observation with field glasses and by patrol activity. The study of the terrain is necessary for ascertaining the best route for the approach. Dense woods or

woods with heavy underbrush, for example, are not suited for night attacks. Every unit commander down to the squad leader now is given a sketch of his attack sector with his attack objective, which he has to imprint on his memory for use in the attack. As far as possible, every rifleman must have a look at it.

In addition to this, the approach direction, with its compass reading, must be given every unit down to the squad. No unit must fail to advance in the direction assigned to it.

"Pathfinders" who have already familiarized themselves with the terrain by action with patrols in the area, may be employed as guides.

We call attention here to the need for radio compass equipment: a guide beam will be transmitted by the guide apparatus to the objective from the jumpoff position—battalion combat post. A messenger with a receiver will be with the attacking unit—a company or a platoon. This messenger picks up the guide beam—long tone—with headphones and leads the way by this means. If he gets off the beam, another signal—short tone—is heard in the receiver as a warning.

It is no longer possible, when guided in this manner, to get off one's course, even when compelled, momentarily, to depart from it somewhat because of enemy fire. Bearings given by this method are, in a way, similar to those employed with aircraft in a night landing at airfields. This apparatus is also suitable for maintaining bearings in a smokescreen.

The following auxiliary means may also be used for maintaining and checking bearings:

Directive fire.—During daylight hours bursts of artillery fire are used to direct troops onto the objective. This same method can be used during a night attack although not too many rounds should be fired as it will alert the enemy.

Tracer ammunition trajectories.—A

heavy machinegun or a 2-centimeter cannon fires at irregular intervals over the heads of the attacking forces, thus indicating the way.

It is clear that such means are only auxiliary since, with any considerable repetition, they would soon arouse the suspicions of the adversary and betray the attack.

2. Ranging of the artillery and heavy infantry weapons.

The heavy weapons adjust their ranges in an inconspicuous manner—over a period of several days—so that they can support the attack by counterfire on the enemy's heavy weapons. This is done only after the enemy has discovered the attack and is attempting to repulse it.

Also, during the days preceding the attack, known, important enemy objectives may be reduced by means of artillery fire or bombing by aviation without betraying the coming attack by overly intensive activity.

3. The attack.

In contradistinction to a day attack, instead of being made over a broad front, the attack is conducted by narrow wedges. In a battalion sector, for example, either a single company attacks or, at most, two wedges are formed which, at first, will be engaged on the two wings. In the first case, the main body of the battalion which follows, rolls up the enemy position to right and left; in the second case, the adversary is to be held off toward the out- sides and then when caught in a pincers movement, attacked in the center. The first unit actually to make the penetration—platoon or company—assumes the task of providing security and protection to the rear.

Again, in the case of an attacking company, only one platoon is in the advance attack formation. It is unnecessary to have more than two squads alongside one another at the same time while effecting the penetration.

When the attack wedge is too broad, unity of action is impaired, vision is lacking, and it would be easy for one's own units to attack each other as a result of mistaken identity. In addition, keeping the attacking wedge narrow better ensures surprise, for an attacker advancing over a broad front at night would somewhere betray his presence by noise. It is impossible, moreover, in the dark and with a broad front, to ensure lateral cohesion for any considerable length of time.

In the approach, until the enemy discovers the movement, a great deal of time may be consumed because of the need to keep silent. The unloading of all firearms demanded in *Army Service Manual 130-9*, Section 279, during approach, has shown itself to be entirely wrong in practice, since it gives the rifleman the feeling of being unarmed and, in the case of the enemy appearing suddenly, instead of reacting, the soldier is obliged to seek cover, where he loses valuable time loading his weapon. This order was entirely disregarded in practice.

Moreover, the command of the advance squads or platoons is facilitated by the riflemen advancing in relatively close order for the penetration. The large distance and intervals that must definitely be maintained in a daylight attack and which are not diminished until immediately prior to the penetration are omitted from the very beginning in night attacks. The squads work their way to the enemy position in single file and as close together as possible and spread out laterally only at the last possible moment before or during the penetration or when the enemy opens fire, if they are prematurely detected. If the attack is discovered prematurely, then no more time should be lost and the enemy engaged as soon as possible in order to take best advantage of the period during which the enemy must alert its units.

After penetration into the first posi-

tion, every squad then turns its attention independently to the mission that has been assigned to it.

For all these reasons night attacks, in many respects, possess a definite shock character.

The necessity of a good radio network for tactical command down to the level of the squad has already been pointed out, as well as the necessity for the assault infantry to be armed with as many machine pistols and assault rifles as possible.

It may be briefly mentioned that a night-sighting device for pistols, machine pistols, and assault rifles was tried out in Armored Forces Officer Candidate School Number II in Wieschau in March 1945. It consisted simply of a flashlight which was mounted on the barrel of the weapon. The lamp was turned on by the trigger mechanism as the trigger slack was taken up. The beam at 55 yards had a diameter of only a hand's breadth, and practically represented the line of sight, since the lamp was mounted parallel with the barrel. If the light beam was on the target, the trigger was pulled farther back until the weapon was discharged. Aiming was, therefore, surprisingly simple and required but little time. The lamp was shut off by the discharge of the gun, whereupon, the rifleman was again left in the protection of the darkness. The device was easily mounted in place before the weapon was used and had the appearance of a telescopic sight. Since it has never been used again, nothing can be said of its actual value, and it would have to be tested again.

If the penetration has succeeded and the enemy position has been seized, the heavy infantry weapons will be brought up. Thus, when morning arrives, they will be in their new positions ready, immediately, for new operations, depending on the intention of the command and the situation. All things considered, the night attack can be the initial phase of a major

breakthrough of an offensive. It cracks the enemy front and makes it possible for the attack reserves or armored units to break through the following morning into the enemy's rear areas without delay. The breakthrough battles which are often very costly to tanks are largely avoided in this way. In the case of a deeply organized system of positions consisting of several switch positions, a corresponding number of attacks distributed over several nights may precede this breakthrough.

Assault guns for the support of the infantry may be employed at night in very bright moonlight or on nights made bright by snow, in addition to those made useful by the addition of night-sighting apparatus or searchlights. In order not to betray the attack, the assault guns in a night attack must remain in the assembly position until the attacking infantry is detected or has broken into the enemy position. Not until this occurs, do they hasten forward and join in the battle. They are received, first, by the infantry. This is accomplished by colored flash signals and radio, a means by which they maintain contact with the infantry.

At the same time or later, they are assigned the task of providing support for the operation by an infantry commander or by a previously attached liaison detachment.

Operating after the fashion of assault detachments, the rifle squads, in conjunction with the assault guns and after liquidation of the enemy antitank guns, can complete the rolling up of the enemy's main line of resistance and complete the breakthrough of the main field of combat.

A searchlight was tested at the previously mentioned school in Wieschau in 1945 for the combat of targets by assault guns. It is mounted on the gun itself. The terrain is searched with it and the combat of targets up to 330 yards is made possible. The hitting of such a searchlight with any type of firearm showed itself

to be extremely difficult and the infantry would also benefit from its use. This also was never given a practical test in actual operations.

Conclusions

In the event of a Soviet attack, we may look forward, with certainty, to superiority on the part of the Soviet Army in a material sense—tanks, artillery, aviation, and manpower. For this reason, it will be the more necessary for the Western defender to take advantage of nighttime for all combat activity and movement. Only by this means—and especially in attacks—can its own inferiority be compensated for and the valuable human element spared. In the future, as has been the case in the past, the infantrymen will have to count on attacking without armored support, as a rule, but even then a night attack without armored support but with few losses, is to be preferred to a daylight attack with armor and heavy losses.

The increased qualifications necessary for night attacks necessitates a corresponding revision of infantry training with comprehensive treatment of this type of fighting in the corresponding service manuals. Up to the present time, the subject of night combat has been dealt with in a very superficial manner.

When the necessary training in daytime has been completed, the major portion of the training on the terrain should be conducted at night.

In schooling for night combat, special emphasis should be placed on training in the modes of action and conduct of the huntsman, on close combat, on shock detachment training, on training in orientation, and in radio voice communication.

The unit which is to engage in night combat on its own initiative must be better trained than a unit which fights at night only because it is forced to by the enemy.

BOOKS OF INTEREST TO THE MILITARY READER

THE AMERICAN TRADITION IN FOREIGN POLICY. By Frank Tannenbaum. 178 Pages. University of Oklahoma Press, Norman, Okla. \$3.50.

By COL JAMES E. MRZEK, *Inf*

Today, a great debate is raging on the proper American approach to foreign affairs. One school, proposing the "realistic" approach, would invoke power politics. The other, for which Professor Tannenbaum is an eloquent spokesman, asserts, "the democratic faith is the basis of everything we cherish and is the overriding law of American policy both at home and abroad."

Professor Tannenbaum concludes that "our ideas of foreign policy are part and parcel of our beliefs in human freedom, in equality of men, and the dignity and independence of nations." His solution to our dilemma is a federation of equal nations.

While his logic is difficult to refute, the fundamental question exists. Can we afford to apply our general time-tested principles derived in a world undergoing a gradual metamorphosis from the Middle Ages to the present one, where changes in political, economic, and ideological spheres are moving at a rapidly accelerated pace? We must be certain we are alert to the application of other methods in assuring our security, as we have been to the adaptation and integration into our way of life of the technological advances in recent years. This book furnishes background to those involved in formulating our foreign policies.

A MILITARY HISTORY OF THE WESTERN WORLD. Volume I, From the Earliest Times to the Battle of Lepanto. By Major General J. F. C. Fuller. 602 Pages. Funk & Wagnalls, New York. \$6.00.

By LT COL MARSHALL H. ARMOR, JR., *Arty*

The "Unconventional Soldier," after 10 years of scholarly labor, has produced a rather unconventional military history which not only describes in detail the decisive battles of the Western World, but places those battles in historical perspective as to the political and economic origins—and effects—of the wars in which they occurred.

Volume I begins with the Battle of Megiddo (Armageddon), where in 1479 B. C. King Thutmose III of Egypt beat a Syrian host with a kind of double envelopment and thereby began his career as history's first empire builder. It concludes with the Battle of Lepanto, 1571 A. D., where 200-odd galleys of the Holy League routed a Turkish armada in the last great clash between oar-propelled warships.

In the sweep of 3,000 years between these two battles, General Fuller relates the wars of the Western World, and 32 other decisive battles, to the development of civilization, and to the rise and decline of great states.

Volume II of the set will end with the Battle of Waterloo, and Volume III will carry on to the present. Together, the three books will undoubtedly constitute a history of wars and warfare which should not be absent from any military library, public or private.

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MacARTHUR: 1941-1951. By Major General Charles A. Willoughby and John Chamberlain. 441 Pages. McGraw-Hill Book Co., Inc., New York. \$5.75.

BY MAJ JEAN K. JONES, *USAF*

The book covers the decade during which MacArthur's history-making activities and colorful character made him one of the most famous and controversial figures of his century.

The authors document these 10 years, giving new facts behind previously misunderstood events, as well as presenting the exciting account of unusual Pacific war activities not heretofore published.

Of perhaps the greatest interest is the MacArthur side of the Korean conflict truce-dismissal issues as presented by the authors. The new perspectives offered here should be of real interest to the military reader.

THE FRENCH THEORY OF THE NATION IN ARMS, 1866-1939. Edited by The Faculty of Political Science of Columbia University. 305 Pages. Columbia University Press, New York. \$4.50.

BY MAJ H. R. DU LATTAY, *French Army*

This book is a remarkable analysis of the concept of the "nation in arms" and of its evolution in France, since the revolutionary period up to the collapse of 1940.

The author shows the patriotic and egalitarian origins of the theory of the nation in arms and describes its successive stages. He then traces the nefarious influence of the frequent political struggles which gave birth to an incomplete and rigid conception of the nation in arms, and which was largely responsible for the prevailing defensive mentality of 1939.

This book will be of interest to the student of contemporary history, and especially for the officer who, more than anyone, must have a clear view of the intricate complexity of the organization of any nation in wartime.

WITH CUSTER'S CAVALRY. By Katharine Gibson Fougere. 285 Pages. The Caxton Printers, Ltd., Caldwell, Idaho. \$3.00.

BY MAJ MARK M. BOATNER, III, *Inf*

Written from the diaries and in the person of the author's mother, this is the story of a young Army girl who left her family in Washington, D. C., for a visit with her sister at Fort Lincoln, Dakota, headquarters of the 7th United States Cavalry. Brevet Major General George Armstrong Custer was in command. The date was 1874.

"Western" addicts will be particularly intrigued by this authentic narrative of the Old West. Through the eyes of an intelligent, cultured young woman we see the day-to-day life on an old Army post and meet the officers of the 7th Cavalry.

This book's delightful literary style deserves special mention. In addition to its intrinsic charm as a story of the Army's "dim, dark days beyond recall," *With Custer's Cavalry* is of considerable historical value.

THE LOST VILLAGES OF ENGLAND. By Maurice Beresford. 445 Pages. Philosophical Library, New York. \$12.00.

BY MAJ JOHN N. HIGHLEY, *USAF*

Here is a new kind of history—not the history found in the usual college text, but the story of the rise and fall of small villages and groups of people. It is a book that must be digested and actually studied in order to receive the full benefit of its pages.

INDEX-DIGEST AND ANNOTATIONS TO THE UNIFORM CODE OF MILITARY JUSTICE. By Colonel Lee S. Tillotson, USA, Retired. 505 Pages. The Military Service Publishing Company, Harrisburg, Pa. \$4.00.

FIFTY YEARS IN CHINA. By John Leighton Stuart. 346 Pages. Random House, New York. \$5.00.

THE RESERVIST'S GUIDE AND RECORD. By Major Daniel J. Kern and Lieutenant Commander George L. Cantzlaar. 233 Pages. David McKay Co., Inc., New York. \$3.50.

By MAJ ELIZABETH A. RUTLEDGE, WAC

This volume is a compilation and discussion of public laws and service regulations pertaining to reserve personnel of the Army, Navy, Air Force, Marines, and Coast Guard presented in question and answer form. It reduces legal phraseology to simple and readable terms.

It will be current, however, only for as long as the Selective Service Act of 1948, the Reserve Officer Personnel Act of 1954, and the service regulations upon which it is based remain essentially unchanged. It should be used as a guide only, as the title indicates, and always in conjunction with the latest regulations whenever a matter affecting a reservist's status is at stake.

DAS HEER 1933-1945 (The Army 1933-1945). By Burkhart Mueller-Hillebrand. 187 Pages. E. S. Mittler & Son, Inc., Darmstadt, Germany. \$3.57.

By Lt COL W. C. MAGATHAN, JR., *Arty*

In this book, the first of three volumes, the author, a former German Major General, has sketched the development of the German Army from the Treaty of Versailles up to the outbreak of war in 1939.

In crisp, clear language, Mueller-Hillebrand has given a comprehensive coverage of the following aspects of the Army's resurgence: political factors; legal bases; organization, training, disposition, and expansion of the active and reserve forces; mobilization planning in all its ramifications; frontier defense; and command and staff organization, including tables and appendices amplifying the text.

This book, written in the German language, is a refreshing contrast to the weighty tomes the hard-pressed reader usually encounters in this field.

AIR COMMANDO. By Serge Vaculik. Translated by Edward Fitzgerald. 320 Pages. E. P. Dutton & Co., Inc., New York. \$4.00.

By MAJ FREDERICK A. SMITH, JR., *Inf*

Air Commando is the remarkable story of Serge Vaculik, a former French parachutist of Czechoslovakian origin who, in the days following the fall of France, risked his life to escape from the Germans and join the Free French Forces of General de Gaulle in London. The story takes the author through the renowned British commando and parachute training which he underwent in preparation for secret operations on the Continent.

The military highlight of the story is a successful raid in Normandy immediately following the Allied invasion. Vaculik with 11 other parachutists blows up a German supply train, an ammunition dump, and an important railroad tunnel.

JET. By Sir Frank Whittle. 320 Pages. Philosophical Library, New York, \$6.00.

By MAJ JACK D. STEVENS, *USAF*

In 1929, Royal Air Force Pilot Officer Frank Whittle presented to the Air Ministry a scheme for propelling aircraft with a gas turbine engine instead of the conventional piston engine. The Air Ministry was still skeptical of the practicability of the "pure jet" engine and rejected the idea. Although disappointed, Whittle was urged by friends to patent his idea, which he did in 1930. Powered by an engine built by Whittle, the world's first successful jet aircraft made its maiden flight 11 years later.

Jet is primarily the story behind this historic event and the subsequent development of jet engines during World War II. It is highly recommended as worthwhile and entertaining reading for all.

THE CASE OF MRS. SURRATT. By Guy W. Moore. 142 Pages. University of Oklahoma Press, Norman, Okla. \$3.00.

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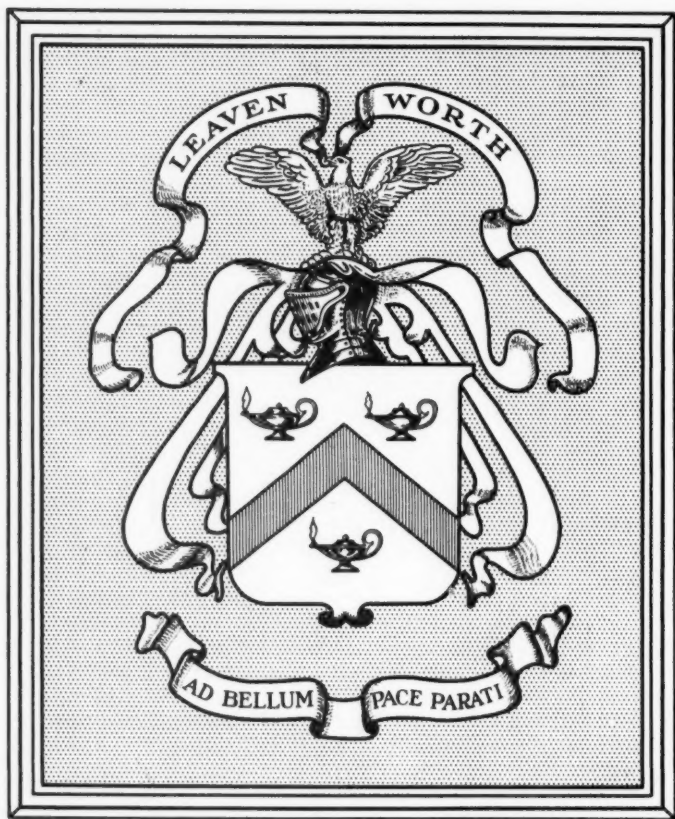
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